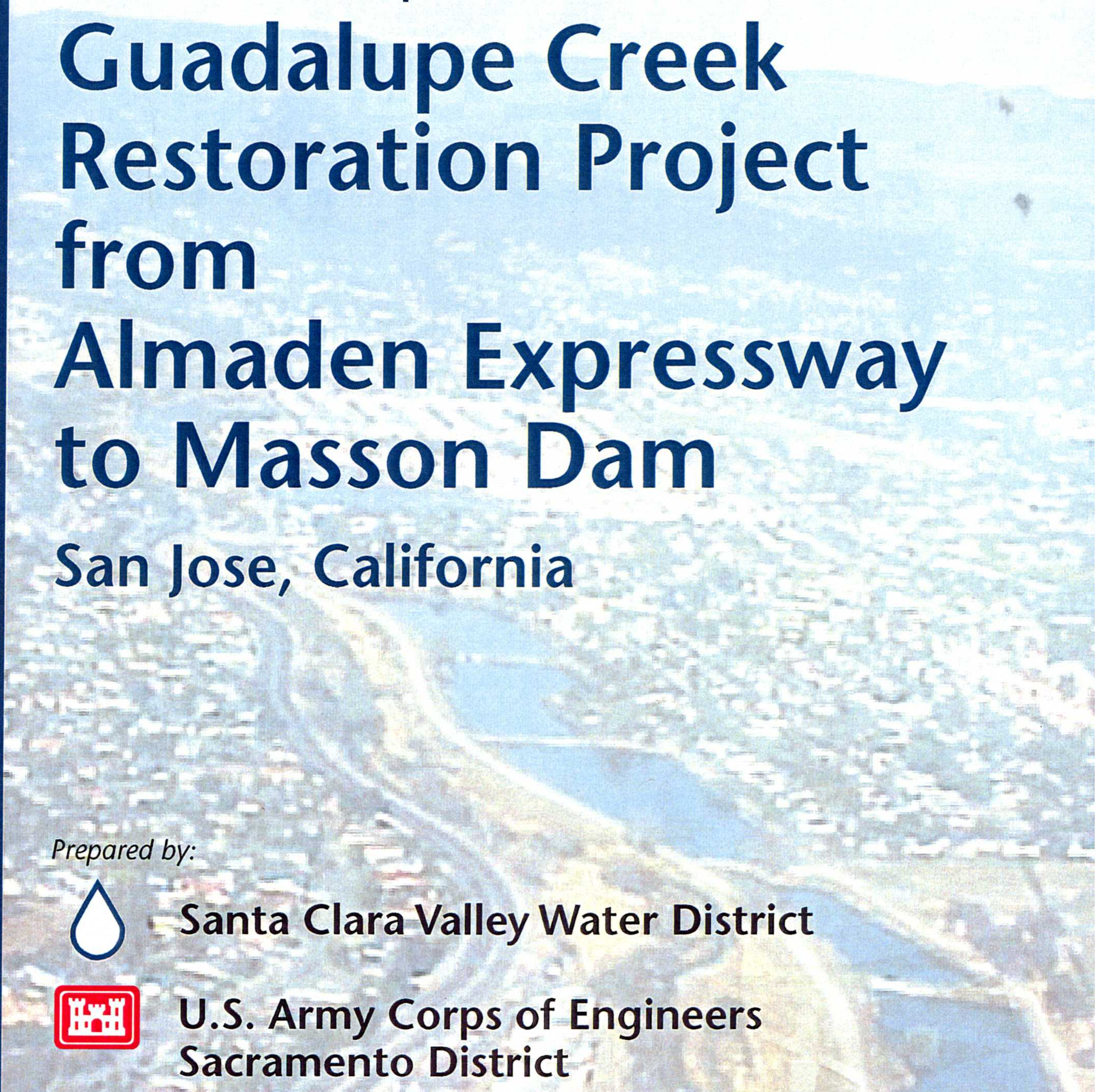

Engineer's Report and
Environmental Impact Report/
Environmental Impact Statement

Guadalupe Creek Restoration Project from Almaden Expressway to Masson Dam

San Jose, California

Prepared by:

Santa Clara Valley Water District

U.S. Army Corps of Engineers
Sacramento District

SANTA CLARA VALLEY WATER DISTRICT

GUADALUPE CREEK RESTORATION PROJECT
BETWEEN ALMADEN EXPRESSWAY AND MASSON DAM

ENGINEER'S REPORT

AND

FINAL ENVIRONMENTAL IMPACT REPORT/
ENVIRONMENTAL IMPACT STATEMENT (SCH# 2000092025)

Project No. 3015

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MARCH 2001

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Chapter 1. Introduction

The purpose of the Guadalupe Creek Restoration Project (Project) is to restore native anadromous fish habitat that has been lost or degraded as a result of urbanization and previous stream modifications. Species that will benefit from the Project include steelhead (*Oncorhynchus mykiss*; federally listed as threatened) and fall-run chinook salmon (*Oncorhynchus tshawytscha*; a candidate for federal listing). In addition to benefitting native anadromous fish, approximately 5,971 linear feet (lf)[1] of the shaded riverine aquatic (SRA) cover vegetation planted along Guadalupe Creek under the Project may serve as offsite mitigation for impacts of the Guadalupe River Flood Protection Project in downtown San Jose (Downtown Project), if the Downtown Project is implemented (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). However, the Project is independent of the Downtown Project and will be implemented even if the Downtown Project is not realized. Vegetation established by the Project will likely exceed the Downtown Project's mitigation requirements. Additional vegetation may provide mitigation credit for future projects by the Santa Clara Valley Water District (District), or may represent "enhancement opportunities" resulting in a net increase in biological resources in the Project area, consistent with District policy. If any of the additional SRA vegetation planted under the Project is used for mitigation credit, the District will cooperate with resource and regulatory agencies to develop and implement a mitigation credit system.

The Project comprises two separate planting and restoration phases. Phase 1 was completed in 1998 and included planting along 1,263 lf of Guadalupe Creek downstream from Masson Dam. Phase 2 (proposed project), is scheduled to be implemented in June 2001 and will result in the installation of approximately 6 acres of riparian vegetation and approximately 13,000 lf of SRA cover vegetation as well as various aquatic habitat features in the lower reaches of Guadalupe Creek between Almaden Expressway and Masson Dam. This Engineers Report specifically addresses Phase 2 of the Project.

---

[1] A total of 7,217 lf of SRA cover vegetation on Guadalupe Creek has been designated as potential off-site mitigation for the Downtown Project; 1,246 lf planted in 1998 as part of Phase 1, and 5,971 lf under this project.

1.1 PURPOSE OF THIS REPORT

This Engineer's Report has been prepared in accordance with Section 10 of the District Act which requires an engineer's report for projects that are to be funded with District revenues. This report includes:

- related projects, programs, and regulations (Chapter 2);
- restoration project background (Chapter 3);
- restoration project elements (Chapter 4);
- alternative solutions and recommended Project, including environmental impacts and mitigation required (Chapter 5);
- description of the maintenance program (Chapter 6);
- Project cost, financing, and staging (Chapter 7);
- conclusions and recommendations (Chapter 8); and
- citations (Chapter 9).

In addition to this Engineer's Report, an environmental impact report/environmental impact statement (EIR/EIS) has been prepared to address potential environmental effects of the Guadalupe Creek Restoration Project. It contains a more detailed discussion of the environmental impacts and mitigation. The EIR/EIS will support decision making by the District, the U.S. Army Corps of Engineers (Corps), and other responsible and cooperating agencies to implement the Project and ensure compliance with the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and other pertinent laws and regulations. The EIR/EIS is bound with the Engineer's Report.

Public hearings will be held on this Engineer's Report and EIR/EIS, and comments will be solicited from the community and responsible agencies. The District Board of Directors will then decide what action, if any, to take.

1.2 PROJECT LOCATION

Guadalupe Creek is located in the southwestern portion of the City of San Jose (City) in Santa Clara County (County). The Project area for resources evaluated in this document encompasses approximately 1.7 miles of lower Guadalupe Creek between Masson Dam and

Almaden Expressway. The Project area is bordered on the north by residential development and the Los Capitancillos percolation pond system, and on the south by Coleman Road (Figure 1-1).

A description of the geomorphic soil and vegetation characteristics of the Project area is provided in Chapter 3.

1.3 OBJECTIVES

The objectives of the Project were developed in phases during a series of meetings involving the District and Project stakeholders. A preliminary set of Project objectives was presented to the public at an open house on February 17, 2000. After a thorough review of comments received at the open house, the Project objectives were refined and a final set of primary and secondary objectives was articulated to guide the formulation and evaluation of alternatives.

1.3.1 Primary Objective

The primary objective of the Project is to restore SRA cover vegetation and improve aquatic habitat for anadromous fish (e.g., steelhead) in lower Guadalupe Creek, between Almaden Expressway and Masson Dam. Restoring SRA cover vegetation and improving aquatic habitat would create and maintain more suitable water temperatures, increase organic material (e.g., leaf and insect drop), and provide habitat to support all life stages of anadromous fish.

1.3.2 Secondary Objectives

Secondary Project objectives represent key physical, ecological, regulatory, and societal benefits other than the Project's primary objective that may be achieved through Project implementation. Expected success in achieving these secondary Project objectives was used to evaluate potential Project alternatives and to identify alternatives for detailed consideration in this document. The Project's secondary objectives are:

- to create 5,915 linear feet of SRA cover vegetation, that may serve as off-site mitigation for impacts of the Guadalupe River Flood Protection;
- to create riparian habitat, including SRA cover vegetation, that may provide mitigation credit for future District projects, or may represent "enhancement opportunities" resulting in a net increase in biological resources in the Project area, consistent with District policy;
- to enhance habitat for other special-status species;

- to restore physical processes and ecological functions along the Project reach of Guadalupe Creek;
- to protect existing infrastructure in the Project area;
- to maintain existing flood conveyance capacity;
- to minimize impacts on existing resources;
- to improve recharge of groundwater aquifers;
- to minimize long-term operations and maintenance requirements;
- to minimize impacts on existing water management operations;
- to strive to meet regional planning objectives as outlined in relevant regional planning documents; and
- not to preclude future recreation uses that are compatible with other Project objectives.

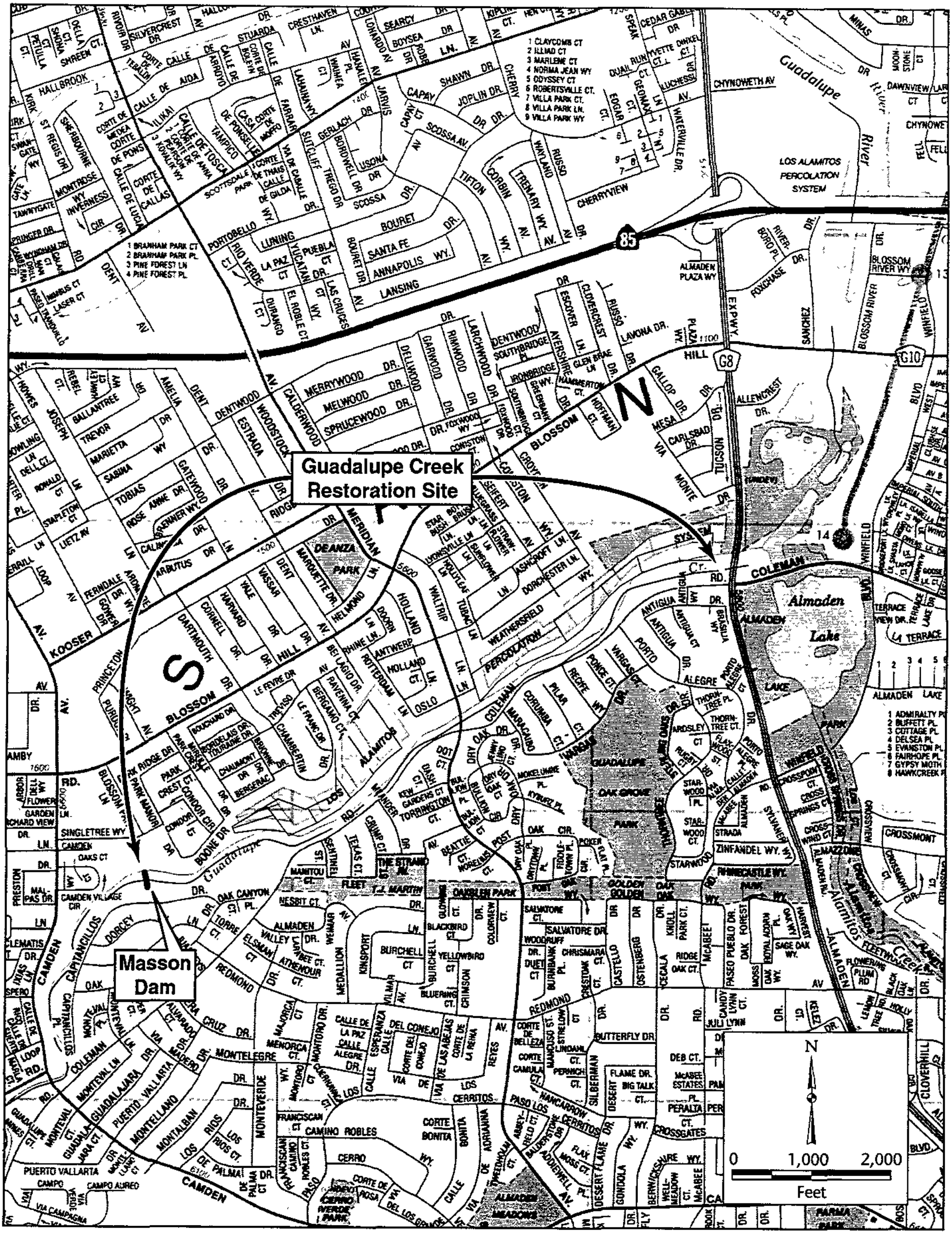

Figure 1-1
Lower Guadalupe Creek Project Area

Chapter 2. Related Projects, Programs, and Regulations

2.1 SANTA CLARA VALLEY WATER DISTRICT

This chapter describes related projects, programs, and regulations as they apply to Guadalupe Creek. Table 2-1 summarizes objectives from relevant projects, programs, and regulations as they apply to Guadalupe Creek.

2.1.1 Habitat Conservation Plan

The District in cooperation with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the California Department of Fish and Game (DFG) has prepared a Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP addresses the District's activities and responsibilities under the federal Endangered Species Act (ESA) of 1973 as amended (16 U.S.C 1531-1544). The District, in preparing this MSHCP, is requesting an incidental take statement under Section 10(a) of the Act to conduct flood protection, water supply, and related activities within the District's operational area. The MSHCP addresses projects, activities, and the process the District will use to evaluate the potential for take of covered species. The MSHCP, including the conservation measures, apply only to the District and its activities.

2.1.2 Guadalupe Fisheries Management Plan

The expected goal of the District's Guadalupe Fisheries Management Plan is to develop a comprehensive management plan to preserve, protect, and enhance the fishery and aquatic resources of the Guadalupe River and those tributaries capable of supporting or contributing to these resources. The Guadalupe Fisheries Management Plan is in the early preplanning stages. The expected objectives of the plan are to:

- provide guidance for fisheries habitat protection and restoration in the Guadalupe River watershed;
- identify actions the District can take to maintain and improve existing habitat for native fish;

- facilitate communication with stakeholders, including environmental organizations, the public, and regulatory/resource agencies;

- provide a focus for the District's Best Management Practices (BMPs), program and project coordination, and budgeting for the Guadalupe River watershed;

- provide a coordinated effort to protect and mitigate impacts on fishery resources associated with construction projects, operations, and maintenance tasks;

- encourage innovative solutions for improving aquatic habitat; and

- act as a catalyst for native fish enhancement efforts in South Bay streams.

2.1.3 Downtown Guadalupe River Flood Protection Project

Modification and implementation of the remaining components of the Downtown Project, known as the Segment 3A and 3B reaches, Segment 3C Phase 2 subreach, and the offsite Reach A and Guadalupe Creek mitigation sites, have been proposed recently. These modifications are intended to accomplish the following objectives.

- Provide 100-year flood protection for the downtown San Jose area.
- Protect species recently listed or proposed for listing under the ESA.
- Meet conditions for water quality certification under the federal Clean Water Act (CWA).
- Refine recreational opportunities along the Guadalupe River corridor.
- Implement mitigation commitments specified in the mitigation and monitoring plan (MMP).

Recommended modifications to the Guadalupe River Project include (1) construction and operation of an underground bypass to convey floodwaters around important riparian habitat, (2) expanded onsite and offsite mitigation, and (3) modification of riverfront features to accomplish habitat and recreational goals.

The Segment 3A reach is between Coleman Avenue and New Julian Street. The Segment 3B reach extends from New Julian Street to Park Avenue. The Segment 3C Phase 2 subreach is at the upstream end of the project area near Interstate 280 (I-280). The project would include construction of flood protection features in the Segment 3A and 3B reaches during 2001–2002 and in the Segment 3C Phase 2 subreach during 2002. Installation of riparian vegetation mitigation within Segment 1 began in 1994 and was substantially completed in 1999. Installation of riparian vegetation mitigation within Segment 2 began in 1998 and was substantially completed in 1999. Installation of SRA cover mitigation began in 1999 and will continue through 2002. Installation of anadromous fish habitat mitigation began in 1994 and will continue through 2002.

Table 2-1. Summary of Objectives for Relevant Projects, Programs, and Regulations

Santa Clara Valley Water District Projects and Programs	
Habitat Conservation Plan	■ identify threatened, endangered, and sensitive species found in Santa Clara County; ■ identify threatened, endangered, and sensitive-species habitats in Santa Clara County; ■ identify future District projects and activities that may affect threatened, endangered, and sensitive species; ■ quantify how much of an affect the District has on threatened, endangered, and sensitive species; ■ identify measures to avoid, minimize, and compensate for impacts to threatened, endangered, and sensitive species; ■ develop a District-wide and creek-by-creek habitat conservation plan; ■ reduce conflicts between District activities and federal statutes and regulations; ■ obtain an incidental take statement from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service; and ■ implement the Habitat Conservation Plan.
Guadalupe Fisheries Management Plan	■ provide guidance for fisheries habitat protection and restoration in the Guadalupe River watershed; ■ identify actions the District can potentially take in maintaining and improving existing habitat for native fish; ■ facilitate communication with stakeholders, including environmental organizations, the public, and regulatory/resource agencies; ■ provide a focus for the District internal BMPs, program and project coordination, and budgeting within the Guadalupe River watershed; ■ provide a coordinated effort to protect and mitigate impacts on fishery resources associated with construction projects, operations, and maintenance tasks; ■ encourage innovative solutions for improving aquatic habitat; and ■ act as a catalyst for native fish enhancement efforts in South Bay streams.
Downtown Guadalupe River Flood Control Project	■ provide improved flood protection for downtown San Jose; ■ protect the environmental quality of the Guadalupe River; ■ provide recreational access to the Guadalupe River; ■ avoid impacts and maximize onsite vegetation; ■ maximize onsite revegetation to replace impacted SRA cover vegetation; ■ provide offsite mitigation to replace impacted SRA cover vegetation; ■ provide fisheries mitigation; and ■ provide thermal mitigation.

Table 2-1. Continued

Santa Clara Valley Water District Projects and Programs – Continued	
Upper Guadalupe River Flood Protection Project	■ reduce potential for flood damage along the upper Guadalupe River; ■ improve upstream fish passage for anadromous fish; and ■ maximize onsite revegetation to replace impacted SRA and riparian vegetation.
Lower Guadalupe River Flood Control Project	■ restore channel capacity between Interstate 880 and Alviso UPRR Bridge; ■ avoid or minimize effects on environmental resources within the Guadalupe watershed, including listed species; ■ provide improved flood protection; and ■ define interim operations and maintenance projects to ensure flood management system performance and reliability and to maintain cost-effective flood protection during project implementation.
Stream Maintenance Program	■ standardize and codify practices and protocols for routine sediment removal, stream bank protection, and vegetation management in and around the District's streams and related facilities; ■ identify cost-effective routine stream maintenance practices and protocols; ■ ensure that routine stream maintenance activities reflect the District's policies of environmental protection; ■ establish effective and economically practical compensatory mitigation for significant environmental impacts of routine stream maintenance activities; and ■ establish practices and protocols that optimize operational flexibility.
Regional Projects and Programs	
Santa Clara County General Plan	■ protect and manage natural environmental resources, such as wildlife, vegetation, soils, air, water, and minerals, for their function and ecological values; ■ promote flood control improvements that achieve a desirable balance of resource conservation, flood control, and recreational objectives; ■ maintain and improve water quality through restoration of wetlands, riparian habitats, and other areas; ■ provide for recreation and public trail needs in balance with protecting sensitive resources, such as wetlands and riparian corridors; and ■ preserve and restore natural diversity for its inherent ecological value.

Table 2-1. Continued

Regional Projects and Programs – Continued	
Santa Clara County Countywide Trails Master Plan	■ promote healthy, well-functioning creek, streamside, and Bay wetlands ecosystems that provide: – stable wildlife habitat, corridors that link habitat areas, and protection for endangered species, – passive recreation and interpretive nature study, – aesthetic enhancement of urban and rural settings; ■ restore, where possible, degraded special water environments; and ■ protect the community from flooding.
City of San Jose - San Jose 2020 General Plan	■ preserve, protect, and restore riparian corridors and upland wetlands within the City of San Jose's sphere of influence; ■ preserve habitat suitable for species of special concern, including threatened and endangered species; ■ protect water resources vital to the ecological and economic health of the region and its residents; and ■ protect the community from risk of flood damage.
Santa Clara Basin Watershed Management Initiative	■ preserve, protect, and restore riparian corridors and upland wetlands within the City of San Jose's sphere of influence; ■ preserve habitat suitable for species of concern, including threatened or endangered species; ■ protect the community from the hazards of soil erosion, weak and expansive soils, and overall geologic instability; ■ protect the community from the risk of flood damage; ■ protect water resources because of their importance to the ecological and economic health of the region; and ■ provide park land and recreational areas to preserve significant natural resources and meet the recreational and open-space needs of the community.
Santa Clara County Urban Runoff Pollution Prevention Program	■ provide flood control; ■ reduce the amount of pollutants that enter into waterways to protect the quality of water throughout the watersheds; ■ protect wildlife within the riparian corridor; and ■ protect and restore riparian habitat.

Table 2-1. Continued

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Regional Projects and Programs – Continued	
City of San Jose - Riparian Corridor Policy Study	■ reduce pollution entering the waterways from stormwater runoff; and ■ protect and preserve riparian corridors within the Urban Service Area boundary.
City of San Jose - Riparian Restoration Action Plan	■ restore riparian habitat by planting native species, encouraging natural regeneration of native species, and controlling nonnative species; ■ enhance wildlife and fish habitat by restoring the linkage between existing patches of riparian vegetation, restoring the linkage between baylands and the upper watershed, and controlling nonnative species; ■ protect and improve water quality by controlling erosion and sediment deposition; ■ enhance recreational opportunities by incorporating public use and access into restoration plans; ■ enhance public education and outreach opportunities by incorporating environmental education and interpretation into restoration planning, involving local schools and community groups in restoration activities, and coordinating with existing community programs; and ■ maintain or increase flood protection by incorporating measures to improve channel capacity and reduce channel maintenance into restoration planning.
San Francisco Regional Water Quality Control Board's Water Quality Control Plan	■ protect and maintain thriving aquatic ecosystems and the resources those systems provide to society; and ■ accomplish these goals in an economically and socially sound manner.
Fisheries and Aquatic Habitat Collaborative Effort	■ improve habitat conditions to maintain fish populations in good condition; ■ protect, maintain, and improve habitat conditions for species listed under the state and federal Endangered Species Acts or identified as California species of special concern; and ■ improve the availability and suitability of stream corridor and channel habitat for a diversity of fish and wildlife species.

Notes:

The objectives summarized in this table have been simplified from the original text. For the exact wording of each objective, please refer to the original documents.

District = Santa Clara Valley Water District.
SRA = Shaded riverine aquatic.

The Downtown Project previously proposed concrete armoring for most of the riverbank and river bottom in Segments 3A and 3B. That project would have had significant effects on riparian habitat and SRA cover that would result in adverse thermal impacts to fish habitat. Analyses indicated that no mitigation plan could be developed to mitigate these anticipated thermal impacts. The bypass now proposed would reduce the amount of riparian vegetation and SRA cover affected while still meeting the original goal of providing flood protection to downtown San Jose and vicinity. The proposed bypass also would significantly reduce the need for riverbank and river bottom armoring required. A bypass system was selected as the best method for avoiding or minimizing effects on riparian resources and on federally listed fish and wildlife species. The bypass system would run underground on the east side of the Guadalupe River from the vicinity of West Santa Clara Street to Coleman Avenue.

The environmental commitments of the project include measures to compensate for effects associated with construction, operation, and maintenance. A continuous riverwalk trail system will be developed between Coleman Avenue and Park Avenue. The riverwalk system will be asphalt paved and 12 or 18 feet wide to accommodate both flood protection maintenance use and the estimated 1.3 million annual visitors to the project area.

Construction and mitigation activities associated with the Downtown Project modification would be initiated in the summer of 2001 and be substantially complete by 2002. Some remaining infill planting for habitat restoration, plus long-term operations and maintenance would continue after 2005.

2.1.4 Upper Guadalupe River Flood Protection Project

The Upper Guadalupe River Flood Protection Project (Upper Guadalupe River Project) has been proposed by the District to reduce the potential for flood damage along the upper Guadalupe River. The project includes channel modifications along eight reaches of the upper Guadalupe River. Proposed channel modifications include constructing bypass channels, widening the channel, adding benches, lining portions of the channel bank with gabions and cribwalls, and constructing floodwalls and levees. These modifications are designed to increase the capacity of the Guadalupe River. The project has a total length of approximately 6.4 miles and is divided into two discrete segments: one from Highway 101 to Interstate 880 (I-880) (Reach A) and another from I-280 to above Blossom Hill Road (Reaches 6 to 12). Modifications also have been proposed on adjacent portions of two tributaries, Canoas Creek and Ross Creek. Construction of the Upper Guadalupe River Project is expected to take place over the 25-year period from 2002 through 2025. Expected flows from a flood protection project in the upper Guadalupe River were included in the modeling of the design floodflow for the Guadalupe River Project with Proposed Action.

The Corps' 1985 Guadalupe River Interim Feasibility Report and EIS (U.S. Army Corps of Engineers, 1985; Section 1.6.1, Guadalupe River Interim Feasibility Report and Environmental Impact Statement [1985]) did not find economic justification for proposed channel modifications upstream from I-280. In the late 1980s, the District initiated an independent planning study for the

Upper Guadalupe River Project. Planning and design of the Upper Guadalupe River Project continued concurrent with construction of Segments 1 and 2 of the Downtown Project. In 1997, the District and the Regulatory Branch of the Corps, San Francisco District, prepared a draft EIR/EIS for the Upper Guadalupe River Project (Santa Clara Valley Water District and U.S. Army Corps of Engineers, 1997).

The Upper Guadalupe River Project, as presently proposed, will affect approximately 10.45 acres of riparian vegetation, 4,886 lf of SRA cover vegetation, and 1.47 acres of wetlands. Other impacts of the Upper Guadalupe River Project include short-term elevations in stream water temperatures and a net decrease in the amount of in-channel armoring. Informal consultation with USFWS on this project was completed in 1997. No adverse impacts on listed terrestrial vertebrates or plants were identified.

Proposed channel modifications would result in beneficial impacts on stream ecology, hydrology, and fisheries. These include permanently fixing the concrete apron and weir at Hillsdale Avenue (Reach 10C) and a low-flow vehicle-crossing downstream from Ross Creek (Reach 11B) to provide improved passage for fish (interim fixes were completed in November 1998). Both structures are potential barriers to upstream migration by adult salmon and steelhead. Only during peak urban storm runoff or prolonged watershed runoff are flows high enough to allow successful fish passage. Permanently fixing the interim structures would improve access for migrating fish from San Francisco Bay upstream to the drop structure above Blossom Hill Road. The District would also move Stream Gage Station No. 23B, a partial barrier to fish migration, from its location in the vicinity of Pearl Avenue Bridge downstream to the vicinity of the northbound Almaden Expressway bridge (Reach 10B). The new stream gage will be constructed so that it will not be a barrier to fish migration. Stepped pools would be constructed at the Ross Creek confluence and at the Alamitos drop structure upstream from Blossom Hill Road. The District would also improve fish passage conditions on Guadalupe Creek at Stream Gage Station No. 43 and at a concrete channel stream reach midway between the confluence of Pheasant Creek with Guadalupe Creek and Reynolds Road to provide access for migrating fish to an additional 1.3 miles of stream habitat upstream from Masson Dam. In addition, the District proposes to provide for fish passage at the gabion structure on Alamitos Creek upstream from Mazzone Drive and at Stream Gage Station No. 16 on Alamitos Creek. These improvements would provide access for migratory fish to approximately 10.9 miles of upstream fish habitat. Vortex rock weirs would be constructed between Willow Glen Way and Branham Lane (Reaches 9, 10, and 11) to provide instream cover and deepen the feeding areas for fish in the riffle reach of the channel. The weirs would act as a grade-control structure and prevent upstream lateral migration, bank erosion, and aggradation. They would also maintain a low width-to-depth ratio, which would reduce the likelihood of sand or gravel bar deposition and maintain the sediment transport capacity of the stream. The project would remove approximately 5,930 lf (134,400 square feet [sf]) of rubble in the construction area. Approximately 3,375 lf (0.6 bank mile; 84,300 sf) would become natural bank. The Upper Guadalupe River Project is also expected to reduce the frequency and quantity of bank erosion, thereby improving water quality. The proposed riparian mitigation would provide a more continuous riparian corridor along the upper Guadalupe River by reducing the number and lengths of gaps in riparian vegetation.

2.1.5 Lower Guadalupe River Flood Protection Project

The proposed Lower Guadalupe River Flood Protection Project (Lower Guadalupe River Project) includes flood protection measures on the Guadalupe River between I-880 and the Alviso Union Pacific Railroad (UPRR) Bridge and downstream from the Alviso UPRR Bridge in Alviso Slough. The entire length of this project has earthen levees on both banks.

In 1985, during the planning and design of the Guadalupe River Project, it was understood, based on the best available information, that the lower Guadalupe River had adequate capacity to safely convey the 100-year design floodflow of 17,000 cubic feet per second (cfs) (U.S. Army Corps of Engineers, 1985). No adverse impacts on lower Guadalupe River hydrologic or hydraulic conditions were expected as a result of the Guadalupe River Project. In a 1991 agreement with the Corps, the District certified that the lower Guadalupe River had the capacity to safely convey the 100-year design floodflow.

After the January and March 1995 storm events on the Guadalupe River, the District initiated studies to reassess the conveyance capacity of the lower Guadalupe River. In 1998, the District completed the analysis and concluded that the lower Guadalupe River below I-880 does not have sufficient capacity to convey the 100-year design floodflow of 17,000 cfs. From Trimble Road downstream to the town of Alviso, channel capacity has been reduced by approximately 40%, primarily because of sediment deposition. In addition, the lower Guadalupe River analysis assumed that vegetation in the river is mature, which results in an increase in channel roughness. This assumption decreased the modeled capacity of the lower Guadalupe River.

The District is developing the Lower Guadalupe River Project to restore the channel capacity between I-880 and the Alviso UPRR Bridge and to identify alternatives for conveying floodflows downstream from the Alviso UPRR Bridge. The Lower Guadalupe River Project would be implemented by the District to restore the channel capacity guaranteed in the District's 1991 agreement with the Corps. The Lower Guadalupe River Project will provide channel capacity to convey flows from the Guadalupe River Project with Proposed Action and the Upper Guadalupe River Project.

In 1998, the Corps, the District, and the resource agencies (USFWS, NMFS, DFG, and the San Francisco Bay Regional Water Quality Control Board [RWQCB]) agreed through a collaborative process to modify the Guadalupe River Project by using a bypass to avoid impacts on environmental resources. The collaborative discussed whether it was appropriate to proceed with the Guadalupe River Project in light of the new information on the decreased capacity of the lower Guadalupe River. The resource agencies allowed the Guadalupe River Project to remain a separate project on schedule for completion in 2002. Completion of the Lower Guadalupe River Project also is scheduled for 2002.

The Lower Guadalupe River Project EIR/EIS will address a full range of alternatives for flood protection downstream from I-880 and for conveying floodflows downstream from Alviso. The alternatives will be designed to contain the increased flows that would result from the operation of the Guadalupe River Project with Proposed Action and the Upper Guadalupe River Project and to minimize or avoid impacts on environmental resources in the Guadalupe River watershed, including listed species and their habitat. Flood protection elements could include raising existing levees, setting levees farther back from the river, constructing offstream storage, constructing flood bypasses, dredging the channel, or a combination of some or all of these elements. The Lower Guadalupe River Project EIR/EIS will address the potential direct, indirect, and cumulative impacts of each alternative on natural resources in the Guadalupe River watershed. The District will consult with USFWS's Endangered Species Division regarding the potential hydrologic and hydraulic impacts of the Lower Guadalupe River Project. If an impact is identified, appropriate mitigation measures will be included in the EIR/EIS and Biological Assessment (BA) for the Lower Guadalupe River Project, and the District will prepare an MMP for the Lower Guadalupe River Project for review and approval by the Endangered Species Division.

2.1.6 Santa Clara Valley Water District Maintenance Program

The District is currently developing a Program for Maintaining Flood Facilities (Maintenance Program) and is preparing a Maintenance Program EIR to address potential impacts. The EIR will address the impacts of sediment removal, erosion protection, vegetation control, and other program elements on a program level. Alternative methods of accomplishing the work and BMPs will be presented. Any residual impacts that remain after BMPs are implemented will be identified and mitigated.

2.1.7 Total Maximum Daily Load Program

The CWA includes a number of provisions and specifies a variety of programs aimed at improving and maintaining national water quality. Section 303(d) of the CWA requires states to prepare a list of waters within the state that do not currently meet water quality standards. Section 303(d) also requires preparation of Total Maximum Daily Load's (TMDLs) for those waters identified by the state as impaired, where traditional local controls have not resulted in full compliance with the standards. A TMDL is a quantitative assessment of a water quality problem. This can include a pollutant, such as heavy metals or pesticide, or a physical property of the water, such as dissolved oxygen or temperature. A TMDL qualitatively establishes the amount of pollutant in a water body and specifies an allowable load of the pollutant from individual sources that assure water quality standard compliance and beneficial use protection.

Several waterways within the Guadalupe River watershed including Guadalupe Creek and Guadalupe River have been listed on the State's Section 303(d) list of impaired waters. Impairment of water contact recreation (REC-1) beneficial uses through unsafe levels of mercury present in the tissues of sport fish constitutes a violation of the San Francisco Bay RWQCB's narrative water quality objective for bioaccumulation of toxic contaminants. In response, the San Francisco Bay

RWQCB has prepared a work plan for Guadalupe River watershed mercury TMDL preparation, with a final TMDL and implementation plan scheduled for completion in 2003/2004.

2.2 OTHER REGIONAL EFFORTS

2.2.1 Santa Clara County General Plan

The Santa Clara County General Plan was adopted in 1994. Its purpose is to provide the county with comprehensive countywide direction for growth and development from 1995 to 2010. The aims of the plan are expressed through a series of goals that can be classified under four basic themes:

- social and economic well-being;
- managed, balanced growth;
- livable communities; and
- responsible resource conservation.

Technically, the County General Plan is not legally binding for cities under County jurisdiction, many of which, including San José, have separate city-level general plans. However, the County General Plan encourages the voluntary support of Santa Clara County municipalities to achieve its countywide goals.

2.2.2 Santa Clara County Countywide Trails Master Plan Update

The Santa Clara County Countywide Trails Master Plan Update summarizes the County's trails-planning history and presents a master plan for a countywide trail network. The plan was developed by the Santa Clara County Trails Master Plan Advisory Committee and was adopted by the Santa Clara County Board of Supervisors on November 14, 1995. The countywide trail network proposed in the Trails Master Plan Update comprises 535 miles of off-street and creekside trails (105 miles of existing trails and 430 miles of proposed trails) and an additional 120 miles of on-street bicycle-only routes (Santa Clara County 1995). The proposed trail system traverses both public and private lands. To guide implementation of the trail system plan, the Trails Master Plan Update suggests procedures for coordinating with private landowners, establishing trail segment priorities, mitigating environmental impacts, and specifying details of trail design, operations, and management. Construction of the proposed trail system is expected to take place over several decades.

2.2.3 City of San Jose 2020 General Plan

The City of San Jose 2020 General Plan (General Plan) was adopted in 1994 as a comprehensive 25-year plan for the City's Sphere of Influence. It represents the City's assessment of the amount, type, and phasing of development needed to achieve specific social, economic, and development objectives (City of San Jose 1994). Seven major strategies, each defined by specific goals and supported by specific policies, encompass the principal objectives of the General Plan. Of these, both the Greenline Major Strategy and the Sustainable City Major Strategy are vital to the preservation of natural habitat and a healthy living environment in the City.

2.2.4 Santa Clara Basin Watershed Management Initiative

The Santa Clara Basin Water Management Initiative (WMI) was begun in1996, with a stated mission of "protecting and enhancing the watershed, [and] creating a sustainable future for the community and the environment." The WMI was conceived by the Environmental Protection Agency (EPA), the State Water Resources Control Board, the Water District, and the San Francisco Bay RWQCB. The WMI addresses all sources of pollution threatening San Francisco Bay, in order to safeguard water quality throughout the Santa Clara Basin watershed. The central aim of the WMI is to coordinate existing regulatory activities on a basinwide scale, rather than to establish separate regulatory actions for specific issues. Because of its regional scope, the WMI involves the coordination of numerous stakeholders representing a cross section of the Santa Clara Basin business, agricultural, residential, environmental and regulatory communities. A major milestone of the WMI will be the development and approval of a regional watershed management plan.

2.2.5 Santa Clara Valley Urban Runoff Pollution Prevention Program

Fifteen Santa Clara County entities participate in the Santa Clara Valley Urban Runoff Pollution Prevention Program, including the City of San Jose and 12 other local municipalities, the County of Santa Clara, and the Water District. These agencies are co-permittees under a National Pollutant Discharge Elimination System (NPDES) stormwater permit issued by the RWQCB. As a condition of the permit, the participant agencies created an Urban Runoff Management Plan, which identifies the activities various City departments are required to undertake in order to comply with the federal and state requirements of the stormwater permit.

2.2.6 City of San Jose – Riparian Corridor Policy Study

The Riparian Corridor Policy Study (RCPS) was commissioned by the City in 1992 in response to the City's recognition of the biological, recreational, aesthetic, and economic importance of its remaining riparian corridors. The intent of the study was to examine in detail issues related to, and methods for promoting, the preservation of riparian corridors. The RCPS focuses on riparian corridors within the Urban Service Area, on the assumption that corridors outside the Urban Service Area are more widely protected by the County's General Plan. Results of the study were approved in 1994, and underwent revisions in 1999 (City of San Jose 1994). Baseline inventories and policy guidelines from this study provide the City with information necessary to maintain and enhance existing riparian habitats in areas slated for future development. The RCPS includes provisions for a 100-foot setback from streams, as well as other measures designed to minimize the impact of new construction on remaining riparian corridors in the City's Urban Service Area.

2.2.7 City of San Jose – Riparian Restoration Action Plan

The City of San Jose Riparian Restoration Action Plan (RRAP) is a guide for correcting and reversing past damages to streams and corridors within San Jose's Urban service Area. The RRAP area includes 136 miles of streams within the Guadalupe River, San Tomas Aquinas/Saratoga Creek, and Calabazas Creek Watersheds. The primary goals of the RRAP include restoration of riparian habitat by planting locally native species, enhancement of wildlife and fish habitat by restoring connectivity between habitat zones withing the watershed and bay, and the protection and improvement of water quality by controlling erosion and sediment deposition.

The RRAP outlines key technical restoration opportunities and constraints within the planning area. These include opportunities and constraints as it relates to adjacent land use, flood protection, erosion and sedimentation, vegetation and wildlife habitat, and exotic species removal and control. Restoration strategies included in the plan fall under broad categories of technical, education and outreach, and legal strategies. These strategies are designed to be incorporated into a site-specific restoration plan. The Guadalupe Creek restoration plan includes many of the technical strategies found in the RRAP, including the creation of meanders, creating instream cover, removing hardscape, and the use of tree revetments.

The RRAP also provides guidelines for the implementation of restoration strategies. These guidelines include the selection of the project planning and design team, site preparation, plant selection, irrigation, environmental compliance, monitoring, and maintenance.

2.2.8 San Francisco Bay Regional Water Quality Control Board and State Water Resources Control Board Water Quality Control Plan

State Water Resources Control Board (SWRCB) and RWQCB for the San Francisco Bay Region establish policies and procedures that are designed to ensure the protection of surface water and groundwater from degradation. The RWQCB establishes beneficial uses of surface water and groundwater resources, along with narrative and numerical water-quality objectives to protect those uses, in its Water Quality Control Plan for the San Francisco Bay Basin (California Regional Water

Quality Control Board, 1995). The RWQCB administers the NPDES permitting and Section 401 water quality certification processes.

Under the authority of Section 303(d) of the CWA, RWQCB and SWRCB list water bodies as impaired when not in compliance with designated water-quality objectives and standards. Section 303(d) also requires preparation of a TMDL program for waters identified by the State as impaired. A TMDL is a quantitative assessment of a problem that affects water quality. The problem can include the presence of a pollutant, such as a heavy metal or a pesticide, or a change in a physical property of the water, such as a water body and specifies an allowable load of the pollutant from individual sources to ensure compliance with water quality standards. Once the allowable load and existing source loads have been determined, reductions in allowable loads are allocated to the individual sources.

2.2.9 Fisheries and Aquatic Habitat Collaborative Effort

The Guadalupe River, Coyote Creek, and Stevens Creek provide habitat for a variety of aquatic resources, including fall-run chinook salmon and steelhead. Many activities, including water management, urban encroachment, land uses, agricultural use, reclamation, flood protection, and water supply operations by the District, cause concern for the condition of the public trust resources and the quality and availability of instream habitat in the river and creeks. These activities also raise concern about the economic and social impacts of efforts to significantly alter the existing flow regimes of the river and creeks. The District has been named in a complaint filed before the SWRCB for violations of the California Fish and Game Code, the California Water Code, and Public Trust Doctrine related to the District's incremental contribution to the cumulative impacts on chinook salmon and steelhead and their habitat within the river and creeks. The complaint alleges harm to coldwater fisheries as a result of consumptive urban and agricultural water uses in Santa Clara County. To address this complaint, the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) has been initiated jointly by the District and DFG.

The FAHCE will identify factors limiting steelhead and chinook salmon populations in the Guadalupe River, Coyote Creek, and Stevens Creek watersheds. Both flow and nonflow measures will be considered by the FAHCE when addressing the complaint. Participants include the District; DFG; Guadalupe-Coyote Resource Conservation District, Pacific Coast Federation of Fishermen's Associations, and Trout Unlimited, as represented by National Heritage Institute (NHI); NMFS; USFWS; and the City. The FAHCE study is expected to be completed in 2001.

2.3 STATE REGULATIONS

2.3.1 California Environmental Quality Act

CEQA (Public Resource Code 21000 et seq.) provides the foundation for environmental law and policy in California. The primary objectives of CEQA are:

- to disclose to decision makers and the public the significant environmental effects of proposed projects;
- to identify ways to avoid or reduce environmental damage;
- to prevent environmental damage by requiring implementation of feasible project alternatives and/or mitigation measures;
- to disclose to the public reasons for agency approval of projects with significant environmental impacts;
- to foster interagency coordination in the review of projects; and
- to enhance public participation in the planning and environmental review process.

CEQA applies to all discretionary activities proposed, implemented, or approved by California public agencies, including state, regional, county, and local agencies, unless a specific exemption applies.

CEQA requires that public agencies comply with both procedural and substantive requirements. Procedural requirements under CEQA include the preparation of appropriate environmental documents, consideration of project alternatives, development of mitigation measures and a mitigation monitoring program. CEQA also specifically provides for public involvement in the review process by requiring public notice of preparation of environmental documents, establishing a public scoping process, and requiring lead agencies to respond to public comments in final environmental documents. CEQA's substantive provisions require agencies to address environmental impacts disclosed in an appropriate document. When avoiding or minimizing environmental damage is not feasible, CEQA requires agencies to prepare a written statement of overriding considerations when they decide to approve a project that will cause one or more significant effects on the environment. CEQA also establishes a series of action-forcing procedures to ensure that agencies accomplish the purposes of the law. In addition, under the direction of CEQA, the California Resources Agency has adopted regulations, known as the state CEQA Guidelines, which provide detailed procedures that agencies must follow to implement the law.

This EIR/EIS was prepared to comply with the requirements of CEQA and the CEQA Guidelines.

2.3.2 California Fish and Game Code, Sections 1601–1607 (Lake or Streambed Alteration Agreement Program)

Under Sections 1601–1607 of the California Fish and Game Code, DFG regulates projects that affect the flow, channel, or banks of natural bodies of water. Project proponents are required to notify and enter into a streambed alteration agreement with DFG before beginning construction of a project that will: (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; (2) use materials from a streambed; or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake. Sections 1601–1607 typically do not apply to drainages that lack a defined bed and banks, such as swales and vernal pools.

The District has submitted a Section 1601 application to DFG for a Lake or Streambed Alteration agreement. It is anticipated that the District will receive an agreement from DFG in May 2001.

2.3.3 California Endangered Species Act and Implementing Regulations

The California Endangered Species Act (CESA) protects wildlife and plants listed as threatened and endangered by the California Fish and Game Commission. It is administered by DFG. CESA requires state agencies to seek and conserve threatened and endangered species and thus restricts all persons from taking listed species except under certain circumstances; *take* is defined as any action or attempt to "hunt, pursue, catch, capture, or kill." Section 2080 of the California Fish and Game Code prohibits the take of species listed as threatened or endangered by DFG. However, under Section 2081, DFG may issue incidental take permits for species that are not designated as "fully protected." The requirements for an application for an incidental take permit are described in Section 2081 and in final adopted regulations for implementing Sections 2080 and 2081.

2.3.4 California Air Quality Regulations

State air quality regulations are the responsibility of the California Air Resources Board (CARB), an arm of the California Environmental Protection Agency (Cal-EPA). The California Clean Air Act of 1988 established California ambient air quality standards (CAAQS), which, unlike the federal national ambient air quality standards (NAAQS), represent concentrations that should never be exceeded. Under the California Clean Air Act, attainment of air quality within the state's individual "air basins" (defined on the basis of topography and air circulation patterns) is the responsibility of local Air Quality Management Districts. The Air Quality Management Districts are required to develop plans and strategies for attaining CAAQS. Santa Clara Valley, including the Project site, is located in the southern portion of the San Francisco Bay Area Air Basin

(SFBAAB) and is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD).

2.3.5 California Hazardous Materials Regulations

Various state regulations govern hazardous materials and hazardous waste management. State hazardous waste regulations are primarily contained in the California Code of Regulations (CCR), Title 22, Division 4, Environmental Health. Of particular relevance to the Project are 22 CCR §66261.20 and §66261.24, which establish the threshold limit for total mercury content at 20 mg/kg; material is considered hazardous if its mercury content exceeds this threshold. In addition, the Hazardous Waste Control Law (HWCL) lists hundreds of hazardous and potentially hazardous chemicals, establishes criteria for identifying hazardous materials, regulates the storage, transport, and disposal of hazardous wastes, and identifies hazardous wastes that cannot be disposed of on land. In addition, water quality regulations developed from the Porter-Cologne Water Quality Control Act (see following section) are designed to protect the quality of waters in California; CCR Title 23 contains the water quality regulations pertinent to environmental contamination. In the San Jose area, these state regulations are administered by the RWQCB and the District.

2.3.6 Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act of 1975, beneficial uses of California's major rivers and groundwater basins, along with narrative and numerical water quality objectives, are established and periodically reviewed in Water Quality Control Plans (basin plans) (California Regional Water Quality Control Board 1995). CWA assigns the primary responsibility for protecting surface- and groundwater resources from degradation, including oversight of basin plans, to the Regional Water Quality Control Boards. Basin plans are primarily implemented by using the NPDES permitting system to regulate waste discharges.

The RWQCB has not formally designated beneficial uses for Guadalupe Creek. Consequently, water quality in Guadalupe Creek must meet or exceed the necessary requirements for maintaining the beneficial uses of the Guadalupe River. Existing uses of the Guadalupe River include non-contact recreation, and warmwater fish and wildlife habitat; potential uses include contact recreation and migration and spawning of anadromous fish.

2.4 FEDERAL REGULATIONS

2.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321; 40 Code of Federal Regulations [CFR] 1500.1) is the nation's broadest environmental law. NEPA provides an interdisciplinary framework for federal agencies to prevent environmental damage, and contains action-forcing procedures to ensure that federal agency decision makers take environmental factors into account. NEPA applies to all federal agencies and to most of the activities they manage, regulate, or fund that affect the environment. It requires all agencies to consider and to publicly disclose the environmental implications of their proposed actions through the preparation of appropriate documents. The President's Council on Environmental Quality (CEQ) has adopted regulations and other guidance providing detailed procedures that federal agencies must follow to implement NEPA.

This EIR/EIS was prepared to comply with the requirements of NEPA and relevant implementing regulations.

2.4.2 Endangered Species Act, Sections 7, 9, and 10

The USFWS has jurisdiction over species listed as threatened or endangered under Section 9 of the ESA. The ESA protects listed species from harm, or *take*. *Take* is broadly defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."

ESA Section 7 requires federal agencies to consult with the Secretary of the Interior through the USFWS and the Secretary of Commerce through NMFS to ensure that agency projects do not jeopardize the continued existence of endangered or threatened species or destroy or adversely modify critical habitat that supports such species. If a proposed project "may affect" a listed species or designated critical habitat, the lead agency must prepare a BA to determine whether the effect is "adverse." If the effect is determined to be adverse, USFWS and/or NMFS must prepare a biological opinion. If the project does not jeopardize the continued existence of the species, USFWS may issue an incidental take permit under ESA Section 10, which requires the lead to submit a conservation plan addressing project impacts and mitigation measures.

Two federally listed species are known to occur in the Project area: steelhead (federally listed as threatened) and chinook salmon (federal candidate species). Moreover, as part of the Central California Coast evolutionarily significant unit (ESU) for steelhead, the segment of Guadalupe Creek downstream of Guadalupe Reservoir has been designated by NMFS as critical habitat for steelhead. Because the Project will require the issuance of a permit by the U.S. Army Corps of Engineers, San Francisco District, under Section 404 of the CWA (see additional discussion in following paragraphs), the project is considered a federal undertaking and the Corps must comply with Section 7 of the ESA. Accordingly, consultation with NMFS has begun. The potential cost-sharing relationship between the Corps and the District also necessitates Section 7 consultation between the Corps and NMFS.

2.4.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires all Federal agencies to consult with the NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect essential fish habitat (EFH). EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation states that migratory routes to and from anadromous fish spawning grounds should also be considered EFH. The phrase *adversely affect* refers to any impact that reduces the quality or quantity of EFH. Federal activities that occur outside an area designated as EFH but that may, nonetheless, have an impact on EFH waters and substrate must also be considered in the consultation process. In addition, the Magnuson-Stevens Act requires that consultation consider effects on habitat managed under the Pacific Salmon Fishery Management Plan. The Magnuson-Stevens Act states that consultation regarding EFH should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other federal statutes. In most cases, the environmental compliance required for federal activities will satisfy consultation requirements under the Magnuson-Stevens Act. EFH consultation requirements can be satisfied through concurrent environmental compliance if the lead agency provides NMFS with timely notification of actions that may adversely affect EFH and if the notification meets requirements for EFH assessments.

The Downtown Project identified the Guadalupe Creek Restoration Project site as a likely offsite mitigation area for impacts of the Downtown Project on SRA habitat. A general description of the Project is thus included in the project description for the Downtown Project, and the Project's SRA cover elements were included in environmental compliance for the Downtown Project. Based on a finding by NMFS, the Downtown Project's compliance with the Endangered Species Act (see following section) will suffice as the EFH assessment required by the Magnuson-Stevens Act (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000).

2.4.4 Clean Water Act

2.4.4.1 Section 303(d)

Under CWA Section 303(d), the SWRCB and the Regional Water Quality Control Boards are required to list bodies of water as impaired when the traditional permitting processes for waste discharges have failed to maintain designated water quality objectives and standards. CWA Section

303(d) also requires preparation of a TMDL program for waters identified by the state as impaired. A TMDL is a quantitative assessment of a problem that affects water quality. A TMDL specifies the allowable load of pollutants from individual sources to ensure compliance with water quality standards. Once the allowable load and existing source loads have been determined, reductions in allowable loads are allocated to the individual pollutant sources.

Parts of the Guadalupe River system (including Guadalupe Creek, Guadalupe Reservoir, Alamitos Creek, and Calero Reservoir) and the southern part of San Francisco Bay are considered impaired for mercury under CWA Section 303(d), meaning that they contain mercury in unacceptable concentrations. The Project area is under the jurisdiction of the RWQCB, which has prepared a draft TMDL program for mercury for San Francisco Bay. The program calls for a significant reduction in the transport of mercury to the Bay by the Guadalupe River system, and establishes a goal of reducing the concentration of mercury in sediments to less than 0.4 mg/kg total mercury relative to the percentage of material less than 63 micrometers (μm) in diameter.

2.4.4.2 Section 404 and 230

Under CWA Section 404, the Corps and EPA regulate the discharge of dredged and fill materials into "waters of the United States." *Waters of the United States* include lakes, rivers, streams and their tributaries, as well as wetlands. Wetlands are defined for regulatory purposes as areas "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3, 40 CFR 230.3). Project proponents must obtain a permit from the Corps for all discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed action. The Corps may either issue individual permits on a case-by-case basis or general permits on a program level.

Discharges to waters of the United States are further regulated under CWA Section 230. Under CWA Section 230.10(a), Section 404 and other permits may be issued only for the "least environmentally damaging" alternative. That is, a proposed discharge may not be permitted if there is a practicable alternative that would have less adverse impacts and lacks other significant adverse consequences.

For regulatory purposes, the Project area is under the jurisdiction of the Corps, San Francisco District. The District and the Corps have applied for a Section 404 permit for the Project.

2.4.4.3 Section 402

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the NPDES program, administered by the EPA. In California, the SWRCB is authorized by the EPA to oversee the NPDES program through the Regional Water Quality Control Boards.

NPDES permits are required for projects that disturb more than 5 acres of land. The NPDES permitting process requires the applicant to file a public notice of intent to discharge stormwater and to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP, pronounced "swip"). The SWPPP includes a site map and a description of proposed construction activities. In addition, it describes the BMPs that will be implemented to prevent soil erosion and discharge of other construction-related pollutants (e.g., petroleum products, solvents, paints, cement) that could contaminate nearby water resources. Permittees are required to conduct annual monitoring and reporting to ensure that best management practices are correctly implemented and effective in controlling the discharge of stormwater-related pollutants.

The District will submit a notice of intent to discharge stormwater to the SWRCB. The contractor selected by the District to construct the project will be required to prepare and implement a SWPPP and a monitoring program.

2.4.4.4 Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in a discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate, or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401.

The District has submitted a written request to the RWQCB for water quality certification, to comply with CWA Section 401. The RWQCB is expected to issue a Section 401 water quality certification for the Project in May 2001.

2.4.5 Clean Air Act

The Clean Air Act (CAA) of 1970 established NAAQS for six pollutants: carbon monoxide (CO), ozone, inhalable particulate matter (particulate matter with a diameter less than 10 microns) (PM10), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. Most standards were set to protect public health; however, for some pollutants, standards are based on other values, such as protection of crops, protection of materials, and avoidance of nuisance conditions. Except for ozone, NAAQS represent short-term (24 hours or less) concentrations that may be exceeded no more than once per year and annual concentrations that may never be exceeded. NAAQS for ozone may be exceeded no more than 3 days in 3 years.

Areas that fail to meet NAAQS are called nonattainment areas. The CAA requires states to submit a state implementation plan (SIP) for nonattainment areas. The SIP, which is reviewed and approved by EPA, must delineate proposed methods for attaining NAAQS. States that fail to submit a plan or to secure approval may be denied federal funding and/or required to increase emission offsets for industrial expansion. The 1990 Amendments to the CAA established categories of air pollution severity for nonattainment areas, ranging from "marginal" to "extreme." SIP requirements vary, depending on the degree of pollution severity.

CAA's conformity provisions are designed to ensure that federal agencies contribute to efforts to achieve the NAAQS. EPA has issued two regulations implementing these provisions. The general conformity regulation addresses actions of federal agencies other than the Federal Highway Administration and the Federal Transit Administration. General conformity applies to a wide range of actions or approvals by federal agencies. Projects are subject to general conformity if they exceed emissions thresholds set in the rule and are not specifically exempted by the regulation. Such projects are required to fully offset or mitigate project-related emissions, including both direct emissions and indirect emissions over which the federal agency has some control.

2.4.6 National Historic Preservation Act, Section 106

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires federal agencies or agencies for which they provide funding or issue permits to take into account the effects of their actions on cultural resources listed in, or eligible for listing in, the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on these actions.

The Project will require the issuance of a permit by the Corps, San Francisco District, under Section 404 of the CWA; therefore, the Project is considered a federal undertaking. As a result, the Corps must comply with Section 106 of NHPA. Consultation with the State Historic Preservation Officer (SHPO) was completed in July 2000; SHPO concurred with the determination that no historic properties will be affected by implementation of the Project (Abeyta pers. comm.).

2.4.7 Executive Order 11990, Protection of Wetlands

Executive Order 11990 (May 24, 1977) directs all federal agencies to refrain from assisting or giving financial support to projects that encroach on public or privately owned wetlands.

2.4.8 Executive Order 12898, Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." The purpose of the order was to ensure that federal actions and policies do not result in the disproportionate placement of adverse environmental, economic, social, or health impacts on minority and low-income populations. By memorandum on February 11, 1994, the President directed EPA to ensure that agencies analyze environmental impacts (including human health, social, and economic impacts) of proposed projects on minority and low-income communities. This EIR/EIS includes analysis of the socioeconomic and environmental justice impacts of the Project (see Chapter 4).

2.4.9 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. The MBTA is administered by the USFWS, and sets seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10). It is a strict-liability law that incorporates no requirement to prove intent to violate any of its provisions. Wording in the MBTA makes it clear that most actions that result in "taking" or possession (permanent or temporary) of a protected species can be a violation of the Act. The word *take* is defined as meaning "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10.12). The provisions of the MBTA are nearly absolute; "except as permitted by regulations" is the only exception. Examples of permitted actions that do not violate the law are the possession of a hunting license to pursue specific gamebirds, legitimate research activities, display in zoological gardens, bird-banding, and similar activities (Faanes et al. 1992)

2.4.10 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as the Superfund Act) of 1980 (PL96-510) is administered by EPA. It is intended to protect the public and the environment from the effects of prior hazardous waste disposal and new hazardous material spills. CERCLA provides funds to compensate victims and to decontaminate the environment. The Superfund Amendments and Reauthorization Act (SARA) of 1986 (PL-99-499) amends some provisions of CERCLA and provides for a Community Right-to-Know program.

2.4.11 Resource Conservation and Recovery Act

The EPA also administers the Resource Conservation and Recovery Act (RCRA) of 1976 (PL 94-580), along with the Hazardous and Solid Waste Amendments (HSWA) of 1984. This legislation provides the principal regulation for the storage, transportation, and disposal of both solid and hazardous waste. RCRA imposes reporting and permitting requirements, and provides for operational control on those who generate, treat, store, transport, or dispose of hazardous waste.

Chapter 3. Project Area Background

This section provides an overview of existing site conditions and describes how these conditions significantly influence the suitability of the Project area for habitat restoration. Information discussed in this section provides the basic framework for developing and analyzing the Project approaches, developing specific design considerations, and developing and analyzing the recommended alternative. Project area characteristics are grouped by the following topics:

- Geomorpholgy, Hydrology, and Hydraulics
- Soils and Groundwater Hydrology
- Vegetation
- Fisheries
- Land Use, Infrastructure, and Public Health and Safety
- Cultural Resources

3.1 GEOMORPHOLOGY, HYDROLOGY, AND HYDRAULICS

3.1.1 Geomorphology

3.1.1.1 Introduction

The description of Guadalupe Creek geomorphology is divided into four parts. The first part provides a brief overview of the geologic and geomorphic setting of the Guadalupe Creek basin. The second part describes the geomorphic setting of the Project reach, which is located between Masson Dam and the Almaden Expressway. The third part examines the historical evolution of lower Guadalupe Creek, including changes in channel planform, bed profile, and cross section, and identifies key historical events that have contributed to this evolution. The fourth part provides a synthesis of historical trends and identifies future trends that can be expected in the Project reach.

Data Collection and Previous Studies. Information for this geomorphic investigation was obtained from several key sources, including the District, the Corps, the University of California, California State University, and the California State Library systems. In addition, journal article databases covering publications in water resources and engineering were searched for information relating to Guadalupe Creek. A complete list of reviewed documents is provided in Chapter 9. A list of historical aerial photographs collected for this Project is shown in Table 3-1, and a list of historical topographic maps is shown in Table 3-2. In addition to the collection of reports, plans, maps, and aerial photographs, a detailed onsite field investigation was conducted during a 1 week period in November 1999. A series of geomorphic, soils, and vegetation maps produced during this site inventory are shown in Appendix A of this report.

3.1.1.2 Physiography

Guadalupe Creek originates in the steep terrain of the Santa Cruz Mountains and flows north to the Santa Clara Valley where Guadalupe Creek meets Alamitos Creek to form the Guadalupe River (Figure 3-1). Mt. Umunhum, at 3,486 feet, is the highest point in the Guadalupe Creek basin. Major tributaries to Guadalupe Creek are Rincon, Los Capitancillos, and Pheasant Creeks. About 90% of the basin is located in the Santa Cruz mountains and 10% in the Santa Clara Valley. The Guadalupe Creek drainage basin is 15.2 square miles. The upper 6 square miles of the drainage basin is regulated by Guadalupe Dam, which was constructed in 1935. The dam is operated by the District for water supply purposes and has a storage capacity of 3,740 acre feet. Masson Dam, located on Guadalupe Creek at the upstream limit of the Project area, is a small diversion dam operated during the summer months to provide water to the Los Capitancillos percolation ponds.

Mountainous areas of the drainage basin are largely undeveloped, whereas the lower part of the basin in Santa Clara Valley is heavily populated, consisting of residential housing tracts and light industry. Guadalupe Creek is geologically confined in the Santa Cruz Mountains and confined by levees in the lower reach in Santa Clara Valley. The levees begin near Masson Dam, the upstream limit of the Project area, and extend to Almaden Expressway where Guadalupe Creek meets Alamitos Creek to form the Guadalupe River.

Geology. The Guadalupe Creek basin is dominated by highly fractured and faulted sedimentary rocks of the Franciscan Complex. These rocks are highly erodible and primarily composed of sandstone and shale, with lesser quantities of chert, limestone, greenstone, and conglomerate (California Division of Mines and Geology 1990). Other rock types in the basin include volcanic, metavolcanic, and ultramafic (mostly serpentine) rocks. Rocks of the Franciscan Complex are very susceptible to mass wasting processes, such as landslides, rockfalls, and debris flows. Mass wasting tends to be concentrated in higher elevations that receive greater annual rainfall and along stream channels that undercut unstable slopes (Radbruch and Crowther 1973). Mass wasting on a large scale is normally triggered by large storms or seismic events, evidenced by the thousands of landslides that occurred following both the storms of January 1982 (U.S. Geological Survey 1988) and the magnitude 7.1 Loma Prieta Earthquake in 1989 (California Division of Mines and Geology 1992).

The Guadalupe Creek basin is bordered by the Sargent Fault and the San Andreas Fault Zone, located approximately 2 and 4 miles west of the basin, respectively, and by the Hayward Fault Zone and the Calaveras Fault, located approximately 11 miles east of the basin. Large seismic events similar to the Loma Prieta earthquake, which had its epicenter 4 miles south of the basin, are expected to continue along these faults. Numerous smaller faults are found crossing through the Guadalupe Creek basin, most notably the Berrocal Fault Zone. Guadalupe Creek flows to the northwest along the structural alignment of the Berrocal Fault Zone for approximately 2 miles

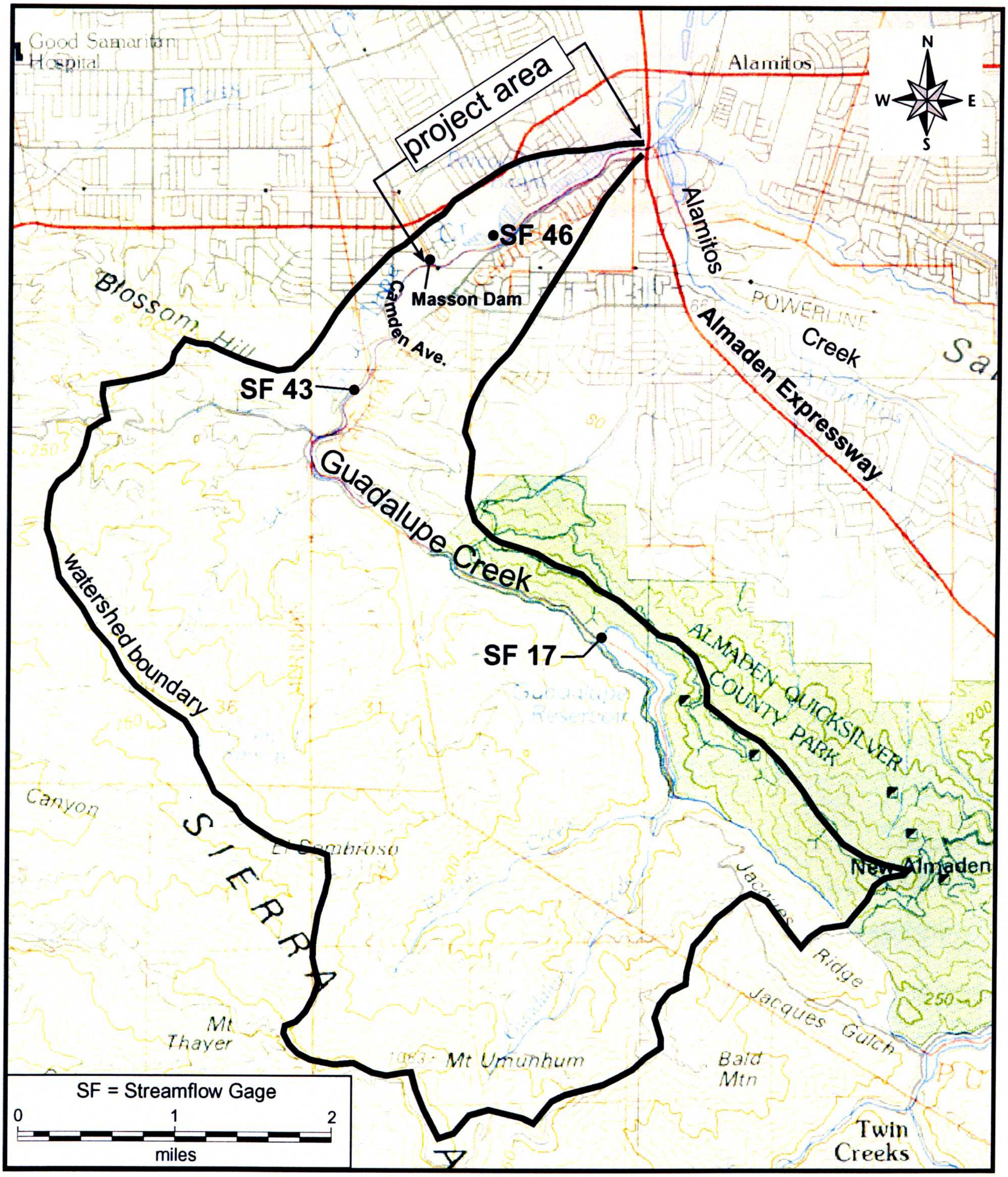


Figure 3-1
Guadalupe Creek Drainage Basin and Project Area

Table 3-1. Historical Aerial Photographs

Aerial Photograph Date	Source	Type	Scale	Series	Print Number(s)	Notes
1939	U.S. Agricultural Adjustment Association	B&W	1:20,000	CIV 285	22, 50, 96	Full coverage
1948	USGS	B&W	1:23,600	GS - HR	1-5, 58; 2-168	Full coverage
1950	USDA ASCS	B&W	1:20,000	CIV 17G CIV 16G	41; 178	Full coverage
1963	USDA ASCS	B&W	1:20,000	CIV 1DD CIV 6DD	184; 66	Full coverage
2/23/1967	District	B&W	1:6,000	65C3 BC	1–7	Full coverage
10/19/70	District	Blueline	1:600	N/A	N/A	As-built plans Guadalupe Creek Project 30026
7/29/1975	District	B&W	1:3,000	none	1–5	Partial coverage, from upstream limit of project reach to upstream from Meridian Avenue
1980	USDA ASCS	B&W	1:40,000	40 06085	179-129	Full coverage
1987	USGS	B&W	1:40,000	519-83	none	Full coverage
7/31/1998	District	Color	1:4,200	000414	151–15-6 ; 17-1–17-9; 16-1–16-6	Full coverage
8/17/1999	Air Flight Services	B&W	1:4,200	N/A	N/A	Full coverage

Notes:
USGS = U.S. Geological Survey.
USDA = U.S. Department of Agriculture.
ASCS = Agriculture Stabilization and Conservation Service.
District = Santa Clara Valley Water District.
B&W = Black and white.
N/A = Not applicable.

Table 3-2. Historical Topographic Maps

Map Name	Author	Edition	Surveyed	Scale	Contour Interval (feet)	Notes
Santa Teresa, California	USGS	1980	1953	1:24,000	10	Photorevised with 1978 aerial photographs
Los Gatos, California	USGS	1980	1953	1:24,000	10	Photorevised with 1978 aerial photographs
Santa Teresa, California	USGS	1968	1953	1:24,000	10	Photorevised with 1968 aerial photographs
Los Gatos, California	USGS	1968, 1973	1953	1:24,000	10	Photorevised with 1968 and 1973 aerial photographs
Los Gatos, California	USGS	1968	1953	1:24,000	10	Photorevised with 1968 aerial photographs
Santa Teresa, California	USGS	1953	1953	1:24,000	10	Aerial photographs taken 1948
Los Gatos, California	USGS	1953	1953	1:24,000	10	Aerial photographs taken 1948
Los Gatos, California	U.S. War Department	1940	1915–16	1:62,500	50	Aerial photographs taken 1937
Los Gatos, California	USGS	1919	1915–16	1:62,500	25	Reprinted in 1942
Township 8 South, Range 1 East (T8S, R1E)	U.S. Surveyor General	3/24/1880	1858–79	1:31,680	None	Township plat map
Map of the Original Locations of the Guadalupe Mine	A.T. Herrmann and C.T. Healey	1878	7/22/1878	1:23,760	None	Cloth map in color, produced by county surveyor
Plat of the Part of the Rancho Canada de Los Capitancillos finally confirmed to the Guadalupe Mining Company	U.S. Surveyor General	8/7/1871	1865–71	1:15,840	None	None
Map of the Lands of the Guadalupe Mining Company	A.T. Herrmann	1871	1871	1:31,680	none	Produced by county surveyor

Note: USGS = U.S. Geological Survey.

downstream from Guadalupe Reservoir before it turns sharply to the northeast to exit the Santa Cruz Mountains and flow into the Santa Clara Valley.

The Santa Clara Valley is located in a structural depression of the Coast Range that has slowly infilled with sediments, creating a broad alluvial valley floor with deposits several tens of meters thick (Norris and Webb 1990). Lower Guadalupe Creek flows on sediments deposited in an alluvial fan environment created as sediment-laden flows exited the Santa Cruz mountains and spread out onto the valley slope. The fan is irregularly shaped, due to geologic control by the Santa Teresa Hills and unnamed hills located just east of the Project reach. The alluvial fan sediments are late Pleistocene (less than 500,000 years old) and younger, consisting of weakly consolidated, poorly sorted, irregularly interbedded clay, silt, sand, and gravel (Figure 3-2). The lower Guadalupe Creek Project reach is underlain by coarse-grained Holocene (less than 10,000 years old) alluvium, characterized by unconsolidated, moderately sorted, permeable sand and silt with coarse sand and gravel (U.S. Geological Survey 1979).

Land Subsidence. The Santa Clara Valley experienced substantial land subsidence due to groundwater overdraft from approximately 1900 to 1965, the year state water deliveries began to arrive in the San Jose area. Measured land subsidence recorded in downtown San Jose at the corner of North First Street and St. James Street was 14.1 feet from 1906 to 1995, with 13 feet (92% of total) occurring before 1966 (Santa Clara Valley Water District 1995a). Guadalupe Creek is located more than 5 miles from the zone of maximum subsidence and more than 1 mile upstream from the zone affected by land subsidence. This distance and the creek's location on the relatively steep, outer margin of Santa Clara Valley makes it unlikely to have been significantly affected by land subsidence. In addition, District efforts to counteract land subsidence through the use of percolation ponds on Guadalupe Creek may have locally reduced the total amount of land subsidence in this part of the Santa Clara Valley.

3.1.1.3 Project Area

Overview. The Project area is approximately 8,700 feet in length and located along an urbanized section of lower Guadalupe Creek between the Almaden Expressway Bridge (station 11+00) and Masson Dam (station 98+00). Appendix B includes maps of the Project area. River stationing in these maps is based on flood studies conducted by the Corps (1973).

Key structural features in the Project area include the Meridian Avenue Bridge at station 54+00 and a sloped concrete wall extending 1,500 feet along the south bank from station 28+00 to 43+00. A levee bounds the north side of the creek and protects the Los Capitancillos percolation ponds and adjacent residential area. The south side of the creek is bordered by Coleman Road from Almaden Expressway to station 78+00, where the road diverges from the creek and a low berm 1–3 feet high continues from station 80+00 to station 92+00. This combination of levee, berm, and grade elevation of Coleman Road acts to confine high flows to a narrow flood corridor, preventing them from spreading onto the historical floodplain and flooding residential subdivisions.

The flood corridor in most of the Project area is relatively straight from Almaden Expressway to station 76+00. Further upstream, the flood corridor exhibits two small bends at station 78+00 and station 95+40, located at the beginning and end of a large field adjacent to the creek. Channel sinuosity in the Project area is very low, 1.07, where sinuosity is calculated by dividing the channel length by the length of the flood corridor. Although fairly straight, several gradual meanders are present in the creek channel and a meander bend that turns abruptly is located at station 47+00.

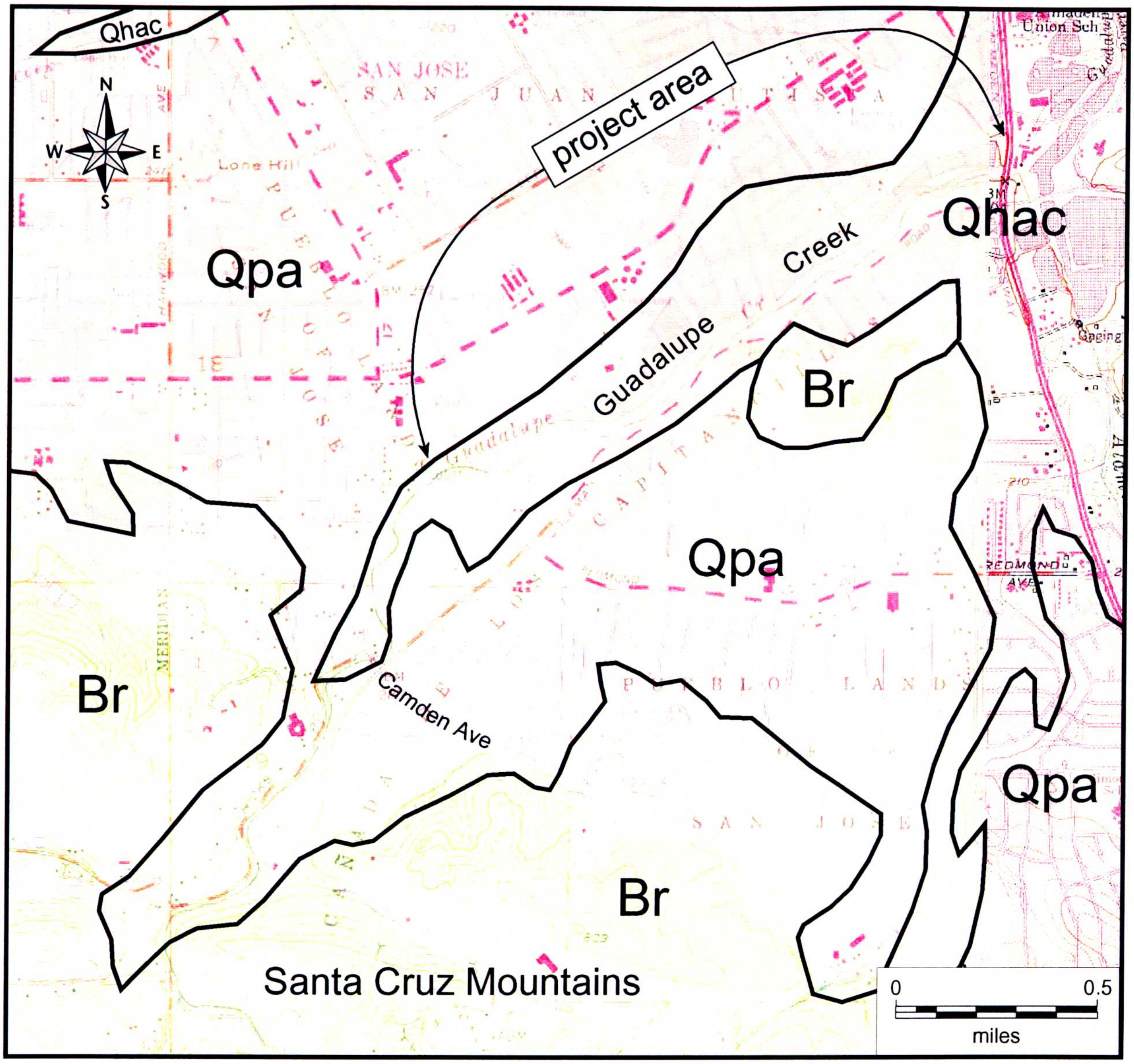
The creek channel is well defined along the entire Project area and characterized by pools, runs, and riffles. At the time of field reconnaissance in November 1999, 60% of the creek length in the Project area was characterized by riffles, 25% by pools, and 15% by runs. Areas characterized as good fish habitat with either undercut banks or pools in excess of 18 inches deep were limited.

Bed and bank material in the Project area ranges from silt and clay to large cobbles. Very few areas in the Project reach present gravel bed material suitable for fish spawning habitat. Most of the creek exhibits some degree of instream aquatic vegetation. Channel banks are largely composed of unconsolidated and unstratified gravel, sand, silt, and clay. Some areas are partially consolidated and resistant to erosion, particularly in the upstream part of the Project area. No major rock outcrops or abrupt changes in stream bed profile were identified in the Project area.

Although relatively short, 1.6 miles, the Project area exhibits significant changes in channel morphology with distance downstream. In the upstream section, from station 74+00 to station 98+00, the creek exhibits a confined, narrow channel cross section with steep, high banks. In contrast, the downstream reach from station 11+60 to station 44+40 is characterized by a wide channel bottom with large, alternating gravel bars and a wide, intermediate-level floodplain bench adjacent to the north bank levee. These key changes in reach morphology are used to identify distinct geomorphic reaches, described below.

Geomorphic Reaches. Key characteristics and changes in channel morphology along the Project area reveal four distinct geomorphic reaches (Figure 3-3): Reach 1 (station 11+60 to 44+40), Reach 2 (station 44+40 to station 59+00), Reach 3 (station 59+00 to station 74+00), and Reach 4 (station 74+00 to station 98+00). Key geomorphic characteristics of each reach are identified below.

Reach 1 (station 11+60 to station 44+40) is 3,280 feet long and located at the downstream end of the Project area from Almaden Expressway to station 44+40, approximately 1,000 feet downstream from Meridian Avenue. This reach is characterized by large, alternating gravel bars that create a broad channel bottom, resulting in wide, shallow flow at relatively low flows. These gravel bars store sediment for later transport downstream and also act as sites for future sediment deposition. A broad floodplain bench, approximately 5 feet above the channel bed, extends along much of the north bank in this reach. The bench is located at an intermediate level between the top of the levee and the channel bed. The bench is a constructed feature created during the 1972 flood corridor expansion, discussed later in this report. The south side of the channel is characterized by a steep slope that rises more than 10 feet with few intermediate bench surfaces. Tree cover over the creek in this reach is the lowest of any of the four geomorphic reaches.



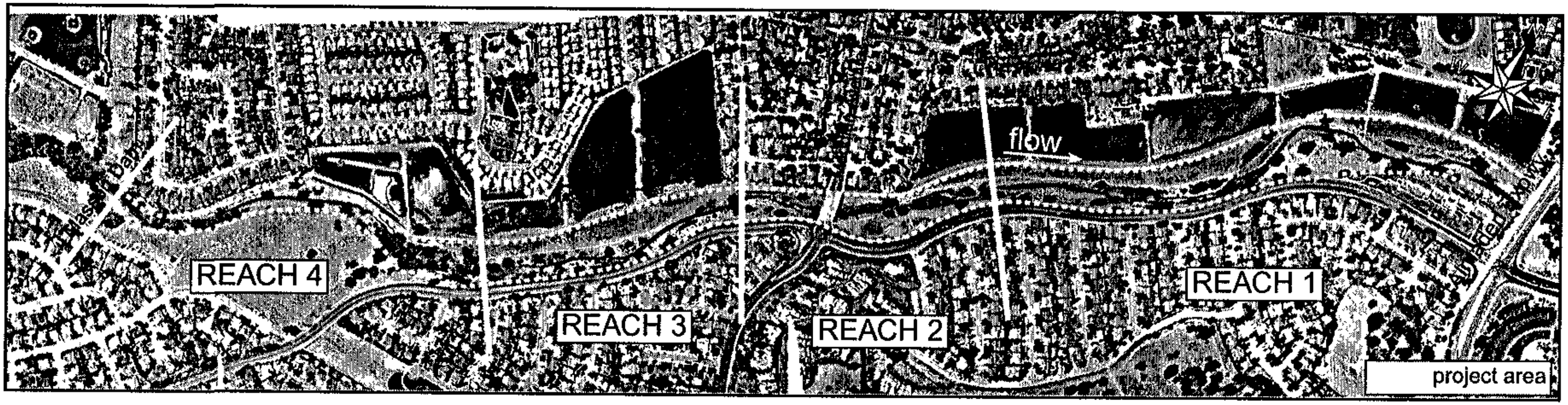
LEGEND

Qpa	LATE PLEISTOCENE ALLUVIUM - Weakly consolidated, slightly weathered, poorly sorted, irregularly interbedded clay silt, sand, and gravel
Qhac	COARSE-GRAINED ALLUVIUM - Unconsolidated, moderately sorted, permeable sand and silt with coarse sand and gravel; more abundant toward fan heads
Br	UNDIVIDED BEDROCK - Older than Pleistocene

Source: U.S. Geological Survey 1979.

Jones & Stokes
nhc

Figure 3-2
Geologic Units in Immediate Vicinity of Project Area



Jones & Stokes
nhc

Figure 3-3
Delineation of Geomorphic Reaches in Lower Guadalupe Creek Project Area

Reach 2 (station 44+40 to station 59+00) is 1,460 feet long and spans a short section of the Project area extending to either side of Meridian Avenue Bridge. Unlike Reach 1, this reach exhibits no large gravel bars and has a much more confined channel cross section, with small intermediate-level benches that alternate between the left and right banks. The flood corridor in Reach 2 narrows to about 150 feet wide where it passes between residential development and Coleman Avenue just upstream from the Meridian Avenue Bridge. This narrowing is due to development on the north side of the creek that restricted widening of the flood corridor during the 1972 flood corridor expansion (Section 3.1.1.4).

Reach 3 (station 59+00 to station 74+00) is 1,500 feet long and characterized by a very wide (100+ feet) floodplain bench on the north bank that extends continuously for approximately 1,500 feet. This bench is, on average, approximately 7 to 8 feet above the channel bed and was constructed during the 1972 flood corridor expansion. Six large trees on this bench were preserved in 1972 by grading around them, leaving raised mounds as high as 5 feet in the upstream part of the reach (station 73+20). The elevation of these mounds identifies the former ground surface prior to cutting the new floodplain bench in 1972. The floodplain bench ends near station 74+00, delimiting the upstream extent of this reach. The south bank of this reach exhibits a steep slope that varies from 12 to 20 feet high and rises to the elevation of Coleman Road. Tree cover in this reach is significantly higher than in Reaches 1 and 2.

Reach 4 (station 74+00 to station 98+00) is 2,400 feet long and located at the upstream end of the Project area. Reach 4 exhibits an entrenched channel cross section that is narrow and confined when compared to the other geomorphic reaches. There are a few small intermediate-level benches in this reach, but in most cases the channel exhibits steep-sided banks that rise more than 10 feet to the top of the floodplain. This type of cross section results in greater confinement of floodflows, allowing for higher sediment transport capacity than in downstream reaches. Masson Dam, located at the upstream end of this reach, was not present at the time of field survey due to its removal for construction of the new fish ladder and dam. Some erosion of sediments that had accumulated behind the former dam site was observed. Trees along the riparian corridor were more numerous in Reach 4 than in any of the downstream reaches, particularly in the vicinity of the stream bend at station 79+00.

The variability in flow conditions created by these geomorphically distinct reaches can be quantified by examining the hydraulic characteristics of small (2-year) and large (100-year) flood events (Table 3-3). The parameters in Table 3-3 identify reach-averaged values for active flow top width, maximum and mean flow depth, and energy slope in each geomorphic reach. Active flow top width is defined as that part of the total flow top width that is actively conveying flow downstream. Thus, it does not include backwater areas where flow velocity is near zero. Energy slope is a measure of changes in stream energy with distance downstream. The last column in Table 3-3 summarizes key characteristics of each geomorphic reach. The values presented in Table 3-3 are drawn from hydraulic modeling results presented in the Hydraulics portion of this report. However, these results are useful here to illustrate the differences in flow width, depth, and energy slope between geomorphic reaches for 2-year and 100-year floodflows.

Two key observations for the 2-year flow can be seen in Table 3-3. First, the active flow top width in Reach 1 is much wider and shallower than the other three reaches, reflecting the wide, shallow flow that occurs over the gravel bars in this reach. Second, the energy slope in Reach 4 is the highest of all four geomorphic reaches. The higher energy slope reflects the relatively confined and narrow cross section of this reach, which results in higher velocities and higher capacity to transport sediment downstream.

Two key observations are evident from the 100-year flow in Table 3-3. First, Reaches 1 and 3 exhibit a flow configuration that is wider and shallower than in Reaches 2 and 4. This reflects the similarities between Reaches 1 and 3 where broad, intermediate-level floodplain benches are present versus Reaches 2 and 4 which exhibit a more narrow, confined cross-section geometry. Second, Reach 4 exhibits a significantly greater energy slope than do Reaches 1, 2, and 3, indicating that higher sediment transport capacity is maintained in this reach for the 100-year flow.

3.1.1.4 Historical Geomorphology

The objective of this portion of the report is to document the historical evolution of lower Guadalupe Creek from available maps, aerial photographs, and documents. Specific attention is paid to documenting changes in channel planform, bed profile, cross-sectional geometry, and historical levels of SRA cover vegetation. Key events that have contributed to these changes are identified from the historical record. Historical maps, aerial photographs, and documents reviewed for this portion of the report are listed in Tables 3-1 and 3-2 and in Chapter 9, respectively.

Timeline. A chronology of significant events pertaining to the history and evolution of lower Guadalupe Creek is presented in Figure 3-4. Events spanning several years are indicated along the top of Figure 3-4, whereas events occurring in specific years are oriented vertically. Historical flood years are indicated by black bars along the x-axis.

The historical chronology of lower Guadalupe Creek begins with Spanish exploration in 1769 and the establishment of a mission in 1777 in what is now Santa Clara County. The region experienced very slow growth for the next several decades, with surrounding lands used primarily for sheep and cattle grazing. In 1842, the lands around lower Guadalupe Creek were granted to Justo Larios and named the Rancho Cañada de Los Capitancillos. Following California statehood in 1850, American and European settlers began to arrive in large numbers. Grazing was replaced by hay and grain fields on the valley floor but continued in the hills surrounding Santa Clara Valley. The lands of the Rancho Cañada de Los Capitancillos were purchased by the Guadalupe Mining Company sometime before 1871, the year a map was produced defining the limits of the property (Table 3-2). The specific use of the land is unclear, but areas further upstream in the Santa Cruz Mountains were mined for mercury. By 1864, the railroad between San Jose and San Francisco was completed, opening a vast new market for the valley's fledgling orchard industry. By 1880, more than 20,000 acres in the valley were covered by fruit trees, and by 1900, more than 100,000 acres were planted. Canning became the valley's first major industry.

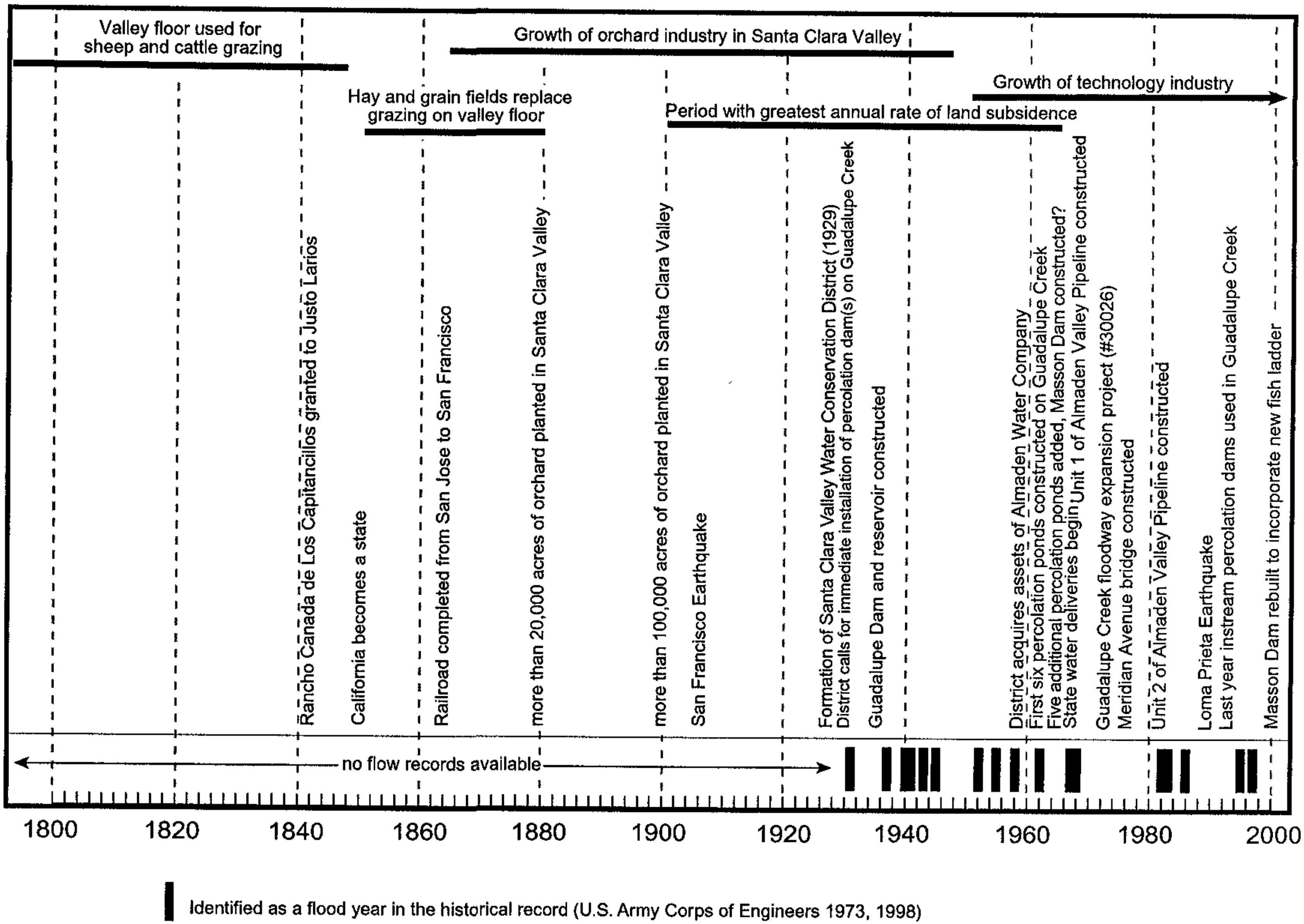


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Figure 3-4
Historical Timeline of Significant Events on Lower Guadalupe Creek

Table 3-3. Reach-Averaged Hydraulic Characteristics of Geomorphic Reaches for 2-Year and 100-Year Flood Events

	Hydraulic Characteristics[a]								
	Active Flow Top Width (feet)		Maximum Flow Depth (feet)		Mean Flow Depth (feet)		Energy Slope[b] (feet per feet)		
Reach	2-Year Flow	100-Year Flow	2-Year Flow	100-Year Flow	2-Year Flow	100-Year Flow	2-Year Flow	100-Year Flow	Notes
Reach 1 (station 11+60 to 44+40)	66.7	171.1	3.1	7.8	1.5	3.7	.0053	.0052	Wide, unconfined channel cross section and flood corridor; large alternating gravel bars; wide channel bottom; intermediate-level floodplain bench on most of north bank; depositional, sediment storage reach.
Reach 2 (station 44+40 to 59+00)	38.5	118.6	4.0	9.6	2.1	4.7	.0061	.0058	Relatively confined flood corridor; narrows through Meridian Avenue Bridge; no large floodplain benches.
Reach 3 (station 59+00 to 74+00)	28.1	170.2	4.1	9.9	2.7	3.4	.0054	.0058	Wide, unconfined flood corridor; large intermediate-level floodplain bench on north bank; several trees on raised mounds of earth left after 1972 excavation work.
Reach 4 (station 74+00 to 98+00)	30.3	99.8	3.8	9.9	2.4	4.7	.0072	.0080	Confined flood corridor and entrenched channel cross section; some small intermediate-level floodplain benches; very few bars; highest tree cover in project area; high sediment transport capacity reach.

Notes:

[a] All values denote average for each reach.

[b] The reach average energy slope is calculated by dividing the difference in the total energy between the upstream and downstream ends of the reach by the reach length.

Widespread overpumping of groundwater for agricultural needs resulted in land subsidence of the valley floor, prompting the first field measurements to be taken in 1906 (Santa Clara Valley Water District 1995a). A plan of action to address this problem was formulated by the Santa Clara Valley Water Conservation Committee in 1920. The plan included the construction of a series of dams and reservoirs to increase groundwater percolation and improve water storage for irrigation uses (McArthur 1981). The plan was voted down by Santa Clara Valley's residents in 1921 but area farmers raised money and began implementing the plan on a small scale. This included the construction of percolation dams on area creeks, though no specific locations are mentioned by McArthur (1981). In 1929 the Santa Clara Valley Water Conservation District was formed following the passage of the Water Conservation Act. After conducting a field inspection in November 1929, the District decided that the immediate construction of instream winter percolation dams on Guadalupe, Almaden, and Lost Gatos Creeks was necessary.

A 1933 plan sheet obtained from the District shows one instream percolation dam constructed on Guadalupe Creek just upstream from Almaden Expressway and a second dam on Alamitos Creek at the confluence with Guadalupe Creek (Santa Clara Valley Water District 1933). Both dams were constructed to provide groundwater recharge to the Santa Clara Valley aquifer, offsetting land subsidence caused by groundwater overdraft. The number, location, and duration of percolation dams used on Guadalupe Creek from 1933 to 1986 is unclear. It is known, however, that two instream percolation dams were in use on Guadalupe Creek for an unknown period until 1986, when two additional dams were added (Aguilera pers. comm.). All four instream dams were constructed from gravel and removed each winter so that floodflows could pass unimpeded. The gravel material was stockpiled for reuse in spring when the instream dams were reinstalled. The percolation dams were part of a larger program that included 44 dams distributed over 11 different streams (Santa Clara Valley Water District 1995b).

Guadalupe Dam was constructed in the upper Guadalupe Creek basin in 1935 for water supply purposes. Agriculture in Santa Clara Valley peaked around 1950, and in the following years, from 1950 to the mid 1960s, a transformation from agriculture to industrial and residential land uses occurred over much of the valley, including the north side of lower Guadalupe Creek. Historical maps also indicate that parts of lower Guadalupe Creek had been actively mined for gravel prior to 1962, the year the percolation ponds were constructed.

In 1962, the first six ponds of the Los Capitancillos percolation pond system were constructed along the north side of the creek. Five additional ponds were added in 1964. Aerial photographs from 1963 show percolation ponds being constructed near Almaden Expressway, which suggests that the upstream percolation ponds were constructed first, followed by the ponds near Almaden Expressway. All of the percolation ponds were protected by a levee that confined creek flows to a narrow flood corridor. This levee reduced the likelihood of flooding adjacent to the creek channel during winter storms; however, it also increased the likelihood of channel degradation because floodflows were concentrated in a more narrow flood corridor.

Masson Dam was constructed some time before April 1964, the date the dam appears as an existing feature on general plans for percolation pond construction (Santa Clara Valley Water Conservation District 1964). District records indicate that the dam was probably built just before the construction of the five percolation ponds located upstream from Meridian Avenue (Aguilera 2000). This time frame would put the time of dam construction somewhere after 1962 but before April 1964.

Masson Dam was approximately 5.5 feet high. Wood flashboards were added during the summer months to divert flows from Guadalupe Creek to the Los Capitancillos percolation ponds. In some years, when flows were not released from Guadalupe Reservoir, the flashboards were left in place to divert flows throughout the winter (Aguilera 2000). A concrete settling basin approximately 45 feet long and 3 feet high was also constructed downstream from the dam. Flows overtopped the dam, flowed through the settling basin, and returned to the creek channel bed approximately 50 feet downstream from the dam.

Maintenance of the dam was required annually. Gravel material was removed from upstream from the dam each spring after the winter flows (Aguilera 2000). Some time between 1964 and 1987, a gate valve was installed and a concrete headwall added so that creek flows could pass around rather than over the top of the dam. This allowed creek flows to transport gravel material around the dam and back into Guadalupe Creek, greatly reducing the amount of gravel accumulation upstream from the dam and the need for annual maintenance.

Prior to Masson Dam, another dam existed approximately 800 feet further upstream. This gravel dam was used for the diversion of summer flows for irrigation. The dam cannot be clearly seen in historical aerial photographs. The irrigation ditch leading from the dam is visible in 1948 aerial photos but not in 1939 photos, indicating that the dam was constructed some time between these two dates. The dam was abandoned in 1958 when the District acquired the assets of the Almaden Water Company, which owned the dam. In 1966, the District constructed Unit 1 of the Almaden Valley pipeline to deliver water from Vasona Pump Station to Guadalupe Creek, and in 1982 Unit 2 of the Almaden Valley pipeline was constructed, allowing for the transfer of water from Guadalupe Creek to Calero Dam.

Due to flooding concerns over new development along lower Guadalupe Creek, the flood corridor was widened in 1972. The Los Capitancillos percolation ponds were reduced in size, set back from the flood corridor, and a new levee constructed, more than doubling the width of the flood corridor in some areas. The new levee was raised several feet above the level of the existing levee and was constructed to match the elevation of Coleman Road, a four-lane boulevard constructed along the south bank of the creek between 1970 and 1972. The new flood corridor was contoured to provide broad, intermediate benches between the new percolation pond levee and Guadalupe Creek. Large trees in the flood corridor were preserved during construction and sometimes appear on raised mounds in areas where the surrounding land was graded lower to increase flood capacity. Detailed cross-section information showing changes made to the channel flood corridor are presented with more detailed discussion later in the "Historical Channel Bed Profile and Cross Sections" portion of this section. Other significant structural changes in the creek included construction of the Meridian Avenue Bridge in 1976. In 1999, Masson Dam was removed so that a new dam incorporating a fish ladder could be constructed. Construction is scheduled for completion in the year 2000.

In 1994, the construction of summer instream percolation dams that had occurred in lower Guadalupe Creek since 1933 was halted temporarily due to the expiration of existing permits.

Several large floods have occurred during the history of lower Guadalupe Creek and are identified along the base of the time line in Figure 3-4. No information about the extent of channel changes caused by these floods was identified for the Project area. Annual peak flow data from the streamflow gage at Camden Avenue, however, indicate that the 1958, 1983, 1986, and 1995 floods were among the largest for the period from 1930 to present. These data are reviewed in detail in Section 3.1.2, "Hydrology".

Historical Channel Planform. Historical maps and aerial photographs of lower Guadalupe Creek are available from 1871 to present (Tables 3-1 and 3-2). A series of topographic maps from Table 3-2 and a 1999 orthogonally rectified aerial photograph from Table 3-1 were selected to create a planform shift map that illustrates shifts in the location of Guadalupe Creek over time (Figure 3-5). Map dates in Figure 3-5 refer to the year of aerial photography on which the map is based and not the date of map publication (Table 3-2). The date of aerial photography represents the year in which the channel planform was observed and usually precedes the year of map publication. Maps and the 1999 aerial photographs were aligned based on common reference points, including lines of latitude and longitude, township and range, and cultural features, such as roads and property lines.

Figure 3-5 shows that the channel planform has remained relatively consistent for the historical period of record, though there is substantial variability about this general trend through time. Much of this variability can be attributed to errors in the 1878 and 1937 maps. When overlaid on more recent topography, these older maps show very substantial divergences in the location of township and range lines and cultural features, found to be as much as 250 feet in some locations. Thus, only the most significant deviations from the current channel alignment are examined in the 1878 and 1937 planform maps. In contrast, channel planform from 1948, 1978, and 1999 is nearly identical in most locations, reflecting general stability in the river channel for the period.

The greatest divergence in channel planform from 1878 to 1999 is located in the downstream section of the Project area where the 1878 channel alignment exhibits a small meander bend in a location now occupied by percolation ponds (Site A in Figure 3-5). The 1878 map provides no information as to why this meander is present; however, 1871 mapping reveals this area as having had multiple flow channels and a broad channel bed, as defined by the county surveyor A. T. Herrmann (Figure 3-6). Thus, the present location of the percolation ponds in this reach lie on what was at one time a section of braided stream channel.

The 1937 channel planform exhibits a significant deviation from later 1948, 1978, and 1999 channel alignments at the upstream-most percolation pond where the 1937 channel is located about 350 feet south of the 1948 channel alignment (Site B in Figure 3-5). Examination of 1939 aerial photographs show, however, that no such channel alignment existed in 1939, but rather that it followed the same alignment as shown in 1948 topography. This, in addition to inconsistencies in the locations of cultural boundaries relative to 1948 and 1978 mapping, casts significant doubt as to the accuracy of 1937 War Department maps.

Comparison of 1948 and 1978 channel alignments show the creek to have had little or no change within the Project area with two exceptions. The first is located at Site B in Figure 3-5, where the creek appears to have shifted approximately 150 feet to the south between 1948 and 1978. Proximity of the 1948 creek alignment to the percolation ponds suggests that this channel shift may be due to an engineered change in creek alignment made during construction of the percolation ponds in the early 1960s. A smaller but similar shift is also observed next to the third pond upstream from Almaden Expressway. This channel shift is also likely due to creek relocation during construction of the percolation ponds in the 1960s, given that the ponds in this location once extended further south than they do today.

The 1999 channel alignment is similar to the 1978 alignment, though there are many small deviations from 1978 in Figure 3-5. These deviations are due in part to limitations in aligning 1999 aerial photographs precisely with the 1978 topographic map. Some of this deviation, however, represents channel migration. In general, the 1999 channel alignment deviates more from the 1978 alignment in the area downstream from the Meridian Avenue Bridge. This part of the creek is characterized by a series of large, alternating gravel bars with a wider channel bottom than in upstream reaches. This morphology allows greater freedom for creek channel migration as compared with more confined reaches upstream and is a likely cause of the observed channel migration in Figure 3-5.

Historical Land Use. Historical aerial photographs were examined to identify changes that occurred along lower Guadalupe Creek and the surrounding area through time. A comparison of the earliest available aerial photographs (1939) is made with recent (1999) aerial photographs in Figure 3-7. Figure 3-7 shows agricultural fields and orchards bordering the Project area in 1939, whereas residential area and percolation ponds are the prominent features in 1999. Although land use changes dramatically from 1939 to 1999, the frequency and density of riparian tree cover remains comparable between the two photographs. Similarly, both time periods show very few areas where the creek is obscured by overhanging vegetation. Comparison of the 1939 and 1980 aerial photographs over a larger area of the creek shows a similar correspondence as well as a general decline in the density of riparian tree cover with distance downstream from the Camden Avenue Bridge (Figure 3-8). This same decline in the density of riparian tree cover is also observed in historical aerial photographs from 1948, 1950, 1963, 1972, 1980, and 1987.

The decline in tree cover along Guadalupe Creek downstream from Camden Avenue coincides with a transition from the Santa Cruz Mountains to the Santa Clara Valley where geologic units change from weakly consolidated, Late Pleistocene alluvium to unconsolidated alluvium (Figure 3-2). The decline in tree cover could reflect these changes in geology, changes that may influence vegetation cover by their effect on subsurface groundwater flow and availability, soil characteristics, and regional topography.

Historical 1953 U.S. Geological Survey (USGS) topographic maps show that lower Guadalupe Creek was once mined for gravel on the north bank at station 38+00 and off-channel on the north bank at station 46+00 (see Appendix B for station locations). Gravel mining in these locations was probably limited, as they are not well defined in historical aerial photographs. In addition, historical aerial photographs from 1939 to 1963 suggest that gravel mining may have

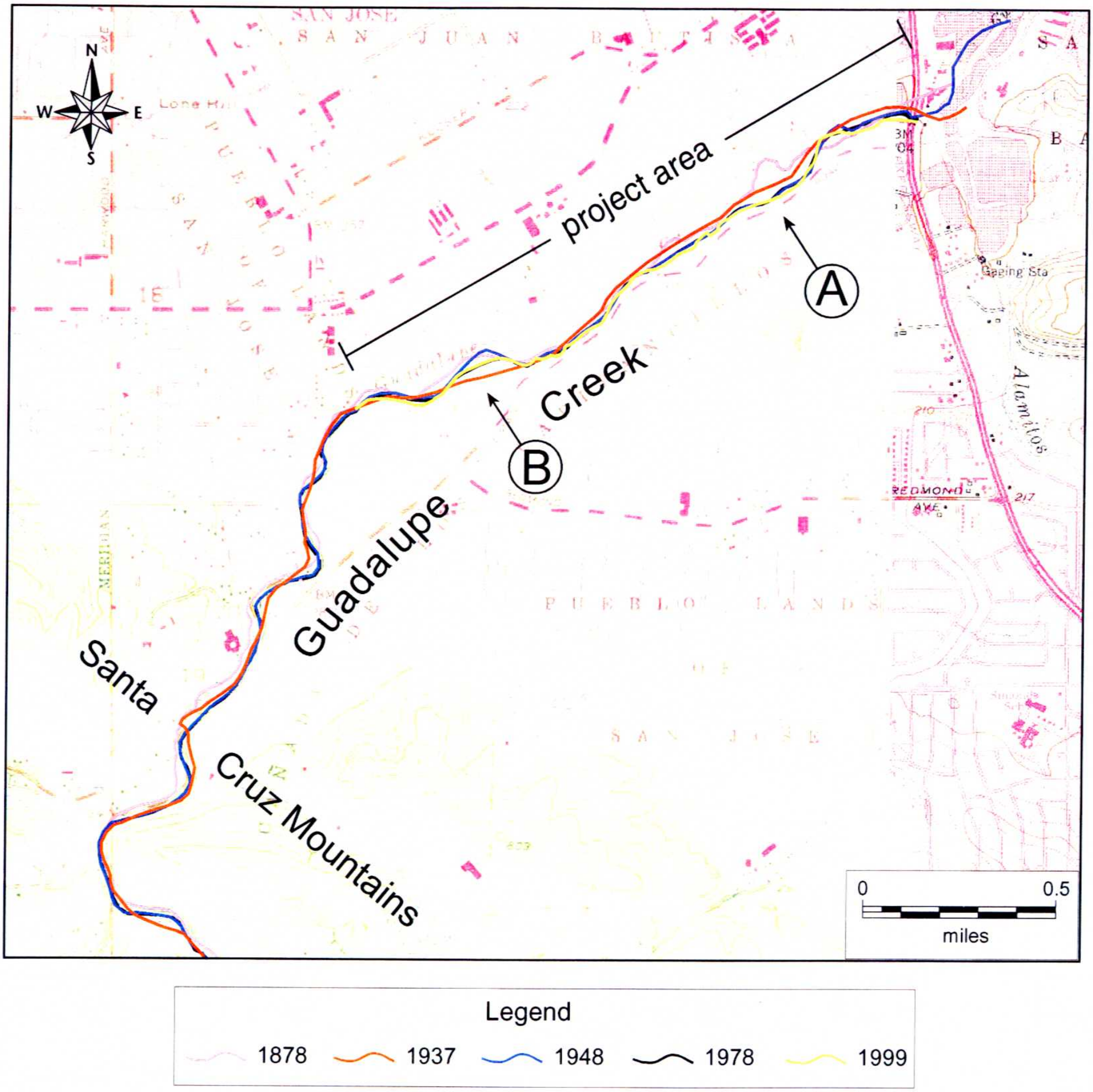

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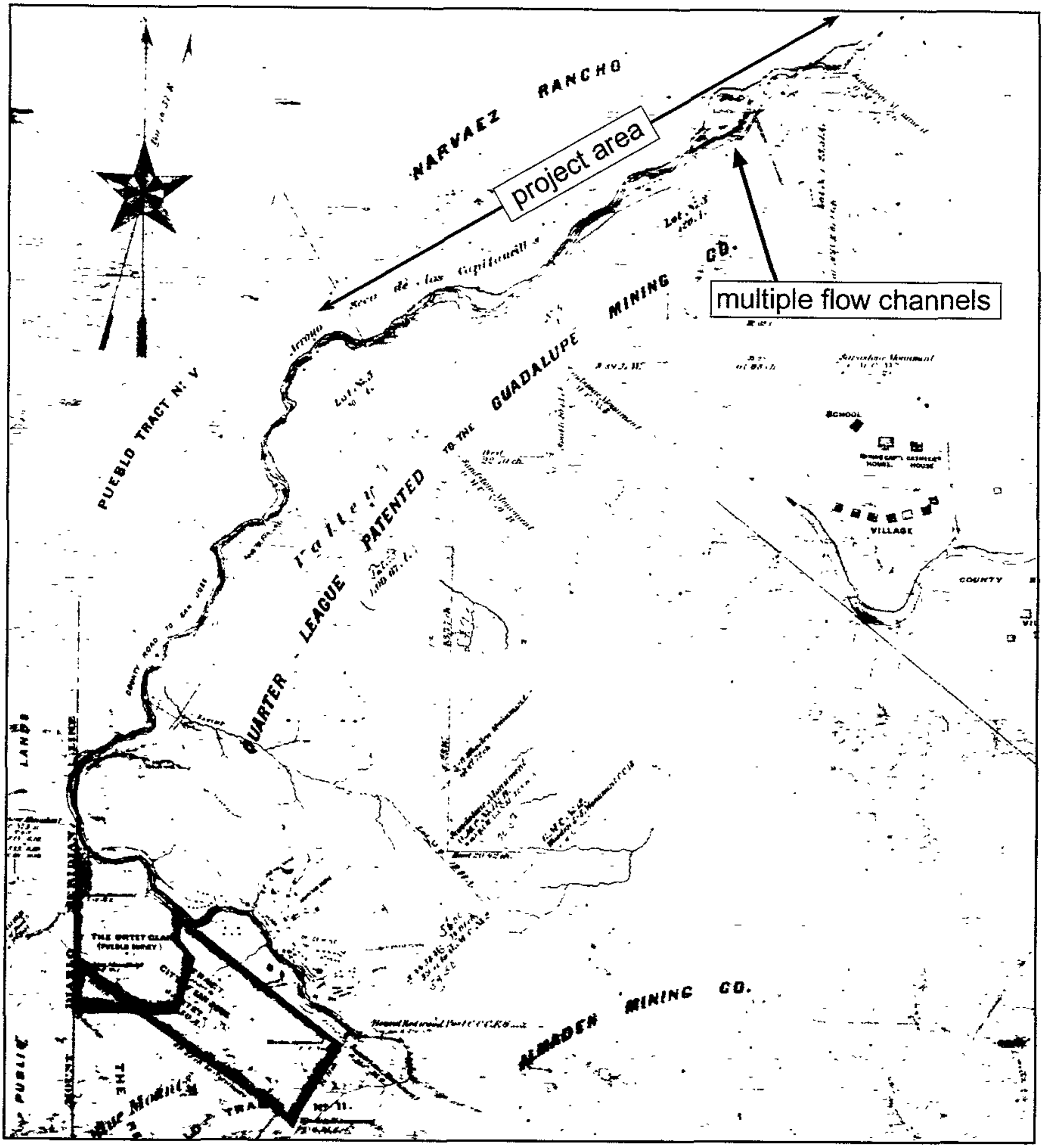
Figure 3-5
Planform Shift Map of Lower Guadalupe Creek



Not to Scale

Figure 3-6
Map Showing Multiple Flow Channels in 1871 Alignment of Guadalupe Creek

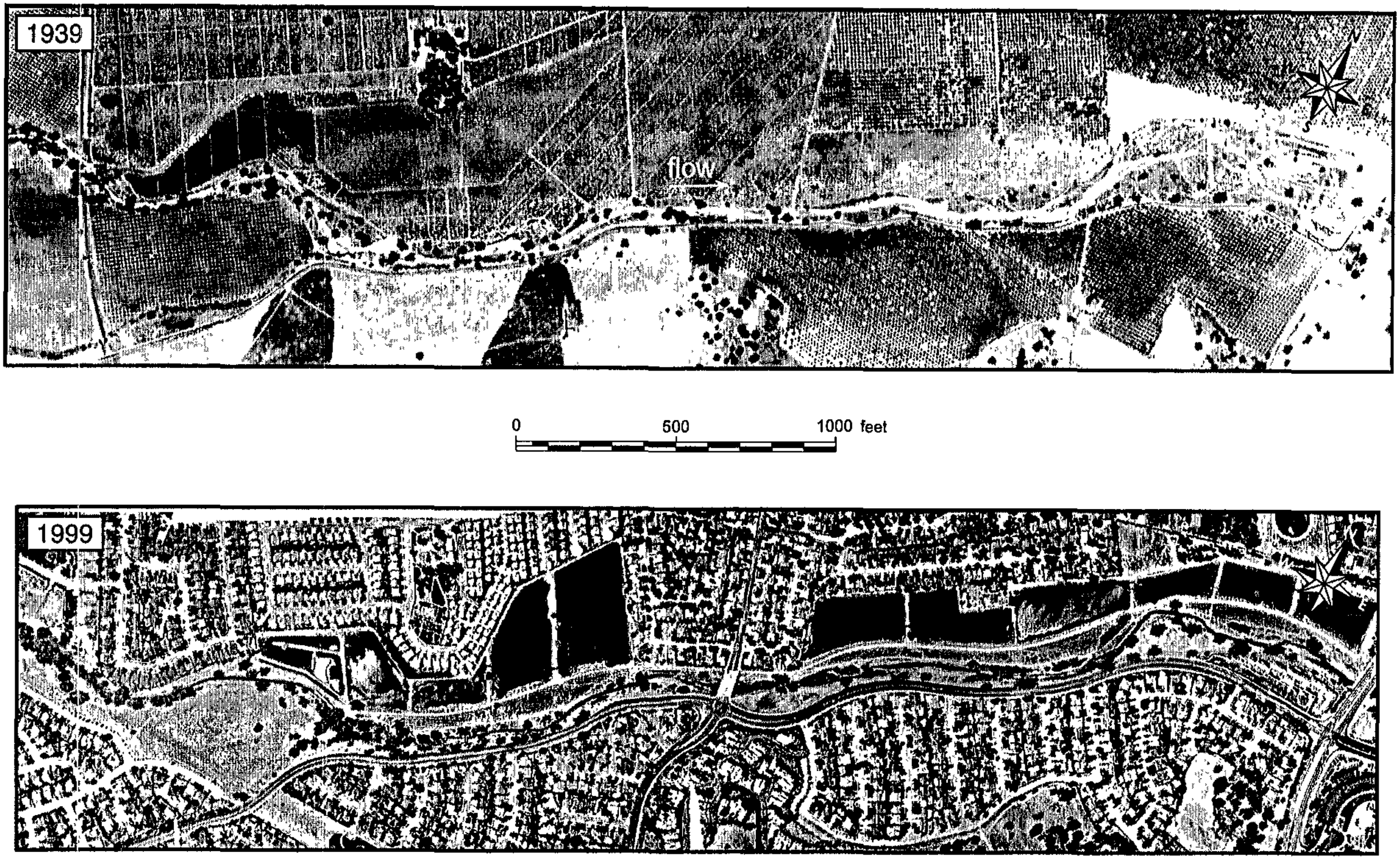


Figure 3-7
Comparison of 1939 and 1999 Aerial Photographs of Project Area on Lower Guadalupe Creek

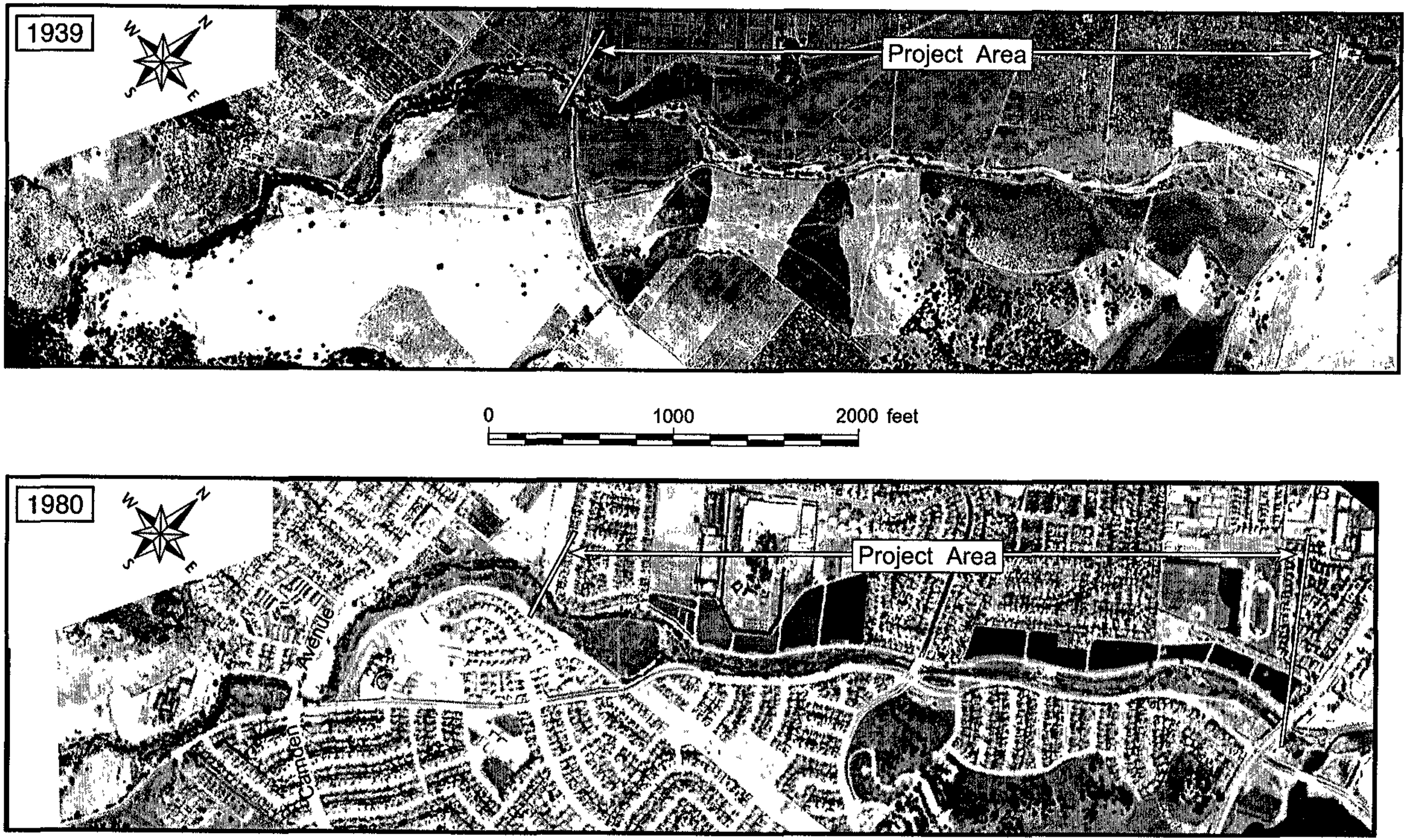


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Figure 3-8
Comparison of 1939 and 1980 Aerial
Photographs of Lower Guadalupe Creek

occurred in a 1,500 foot section extending upstream from the Almaden Expressway. The affected area occupies the full channel width, including the area currently occupied by percolation ponds. The aerial photographs, however, do not clearly show whether the apparent disturbance was caused by mining or by some other form of disturbance, such as the creation of furrows for instream water percolation.

The 1933 plans for the construction of an instream percolation dam on Guadalupe Creek near Almaden Expressway show a narrow berm extending approximately 500 feet from the north bank across the mouth of Guadalupe Creek (Santa Clara Valley Water District 1933). Almaden Road is located on this berm and crosses the creek at a narrow bridge. Whether this berm was constructed or is a remnant of material left in situ by gravel mining is unclear. In either case, the bridge crossing in 1933 is approximately 110 feet wide. This width is comparable to the 120-foot wide opening observed at the Almaden Expressway Bridge today, though most of the Guadalupe Creek side of this berm is now bordered by percolation ponds.

Aerial photographs from 1939, 1948, 1950, and 1963 show instream gravel mining on Guadalupe River and on Alamitos Creek, ranging from approximately 2,500 feet upstream to approximately 2,500 feet downstream from the Guadalupe Creek confluence. Subsequent years (1980 and 1987) show the gravel pits on Alamitos Creek and Guadalupe River largely filled with water, appearing as a sequence of ponds with the largest on Alamitos Creek just upstream from the Guadalupe Creek confluence. This area is now occupied by Almaden Lake, and is presently used for summer recreation purposes.

Another significant feature observed in historical aerial photographs of the Project area is a line of vegetation that intersects Guadalupe Creek in the middle of a gradual bend at station 80+00 (Appendix B). This feature is difficult to see in the 1999 aerial photographs but is clearly evident by a line of shrubs and trees in the 1939 photographs (Figure 3-7). This irregular line of vegetation is also observed in the 1948, 1950, and 1963 aerial photographs. Its proximity to the creek channel suggests this feature may mark the location of a paleochannel or an irrigation ditch now overgrown with vegetation. The line of vegetation is located along the base of a slope between a higher terrace level and the terrace surface adjacent to Guadalupe Creek; therefore, it is also possible that vegetation is concentrated along this area due to increased groundwater availability along the toe of the slope. Aerial photographs in 1999 show a relatively high concentration of trees on Guadalupe Creek at station 79+00. The wide channel bottom at this location and a possible increase in groundwater throughflow are likely contributors to the high density of tree cover in this area.

All historical aerial photographs show varying degrees of roads and tracks crossing through Guadalupe Creek, particularly in the downstream part of the Project area. In general, aerial photographs from 1939 to 1970 show significantly greater disturbance than in later years. Large-scale disturbance of the creek channel is observed as late as 1970, where aerial photographs from as-built plans of the 1972 flood corridor expansion show a gravel haul road graded along the creek bed from Almaden Expressway to station 42+40 (Appendix B). Upstream from this location, the natural creek channel is evident and the creek bed appears less disturbed.

Historical Channel Bed Profile and Cross Sections. Historical channel bed profile data were available for the Project area from the 1972 District as-built plans. An additional data point from a 1933 cross section approximately 800 feet upstream from Almaden Expressway was also available (Santa Clara Valley Water District 1933). General plans for the 1964 percolation pond construction were available from the District but as-built plans for both the 1962 and 1964 pond construction were not. The available data are compared with 1999 bed profile data collected by NHC (Figure 3-9). Examination of Figure 3-9 indicates that the Guadalupe Creek bed degraded approximately 4 feet from the 1933 to 1972 bed elevation at station 19+70. In contrast, most of Reach 1 appears stable from 1972 to 1999, but there is a clear trend of channel degradation observed upstream. The amount of bed degradation is generally greater in Reaches 3 and 4, increasing to as much as 9.0 feet downstream from Masson Dam. Reach 1 shows 0–2 feet of degradation, whereas Reaches 2, 3, and 4 show 1.0–4.5 feet, 1.5–5 feet, and 1.5–9.0 feet of degradation, respectively.

In addition to a channel bed profile, 1972 as-built plans also contain pre- and postconstruction cross-section data (Santa Clara Valley Water District 1972). A total of six cross sections from 1972 as-built plans were located within 20 feet of 1999 cross-section locations, allowing for a direct comparison between the two data sets. The locations of these cross sections in the Project area are shown in Figure 3-10. Cross-section comparisons are shown in Figures 3-11 through 3-16. Three sections are located in Reach 1, two in Reach 2, and one in Reach 3. No cross sections were available for comparison in Reach 4. Station numbers shown for the District cross sections in Figures 3-11 through 3-16 are based on stationing in 1972 District as-built plans (Santa Clara Valley Water District 1972).

Examination of pre- and postconstruction cross sections in Figures 3-11 through 3-16 clearly reveals the large changes made during the 1972 flood corridor expansion. Postconstruction cross sections show an increase in top width of the flood corridor by more than 100% in some locations (Figures 3-12 and 3-16). It is also clear where areas were cut and filled along the newly constructed flood corridor to create a broad floodplain bench on the north bank.

Comparison of pre- and postconstruction surveys show that the creek channel was not changed during construction of the expanded flood corridor; however, the channel bed appears remarkably flat in three of the six cross sections (Figures 3-11, 3-13, and 3-15), suggesting that either the surveyor did not map the channel bed or that there was no well-defined creek channel. If the latter is true, it suggests some form of channel disturbance, such as excavation, filling, or grading prior to the preconstruction surveys. This channel disturbance may have been caused by the construction of a haul road, observed in 1970 aerial photographs in the 1972 as-built plans (Santa Clara Valley Water District 1972). If so, this disturbance would account for the lack of a well-defined creek channel in the preconstruction surveys.

Comparison of 1972 and 1999 cross sections shows incision of the creek channel in the four upstream-most cross sections (Figures 3-13 through 3-16), reflecting the bed degradation that has occurred over time. Channel incision is restricted to the 20- to 30-foot width of the creek channel. As a result, the creek channel is significantly more entrenched in 1999 cross sections when compared to 1972 cross sections (Figures 3-13 through 3-16).

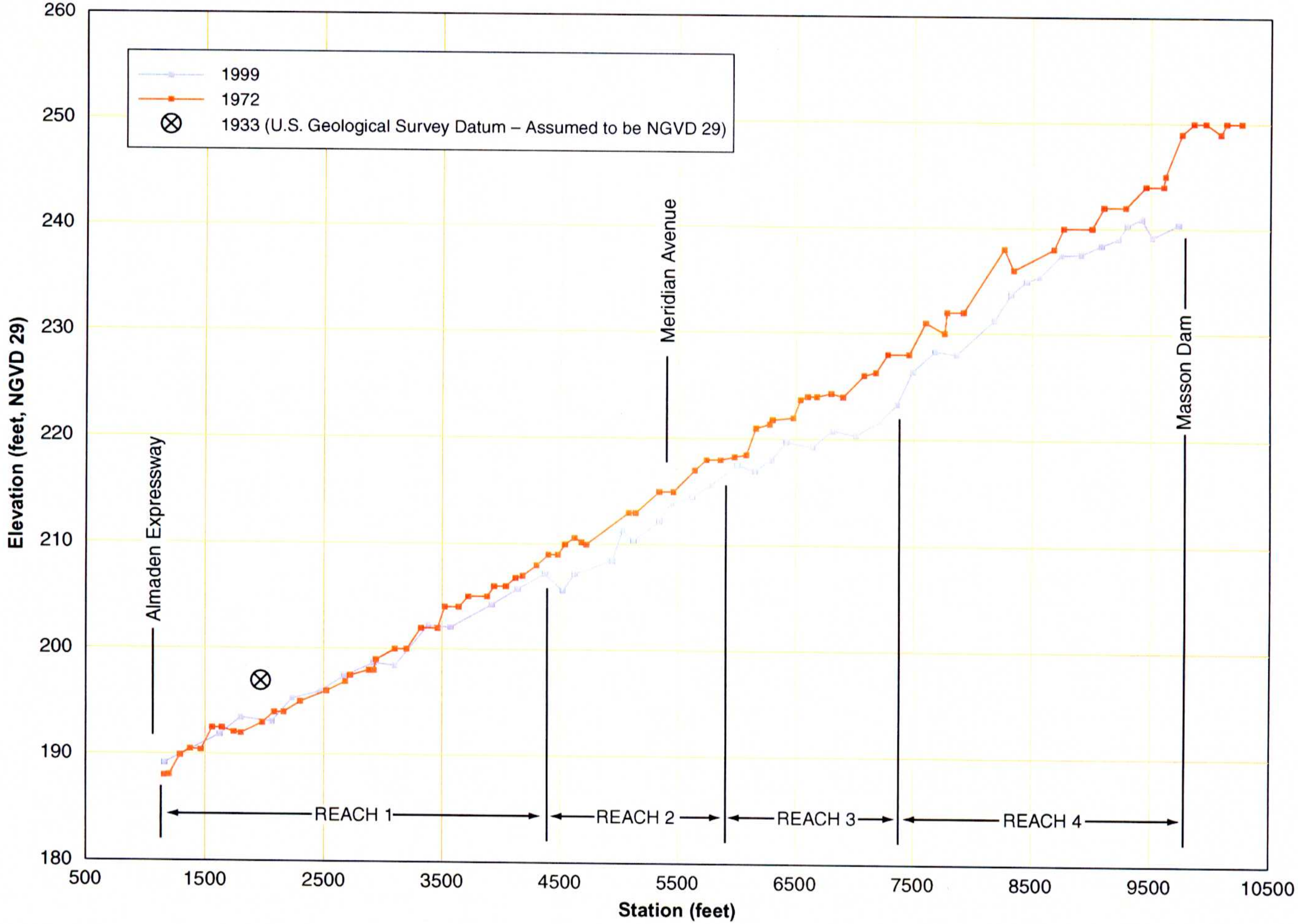

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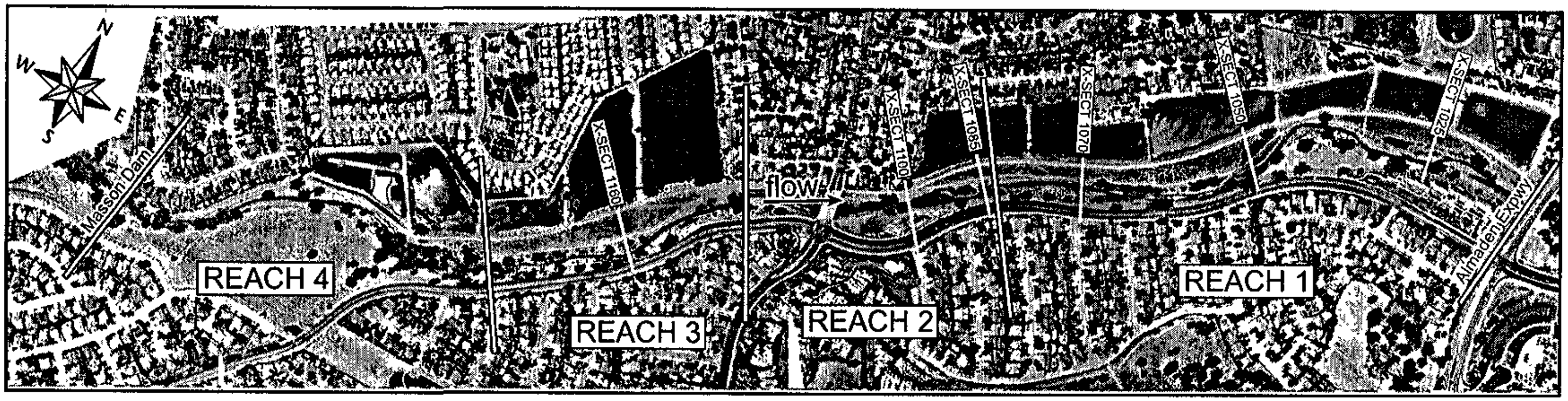
Figure 3-9
Channel Bed Profile Data of Project Reaches from 1933, 1972, and 1999



Note: "X-SECT" = Cross section

Figure 3-10
Station Locations of 1972 and 1999 Cross Section Comparisons

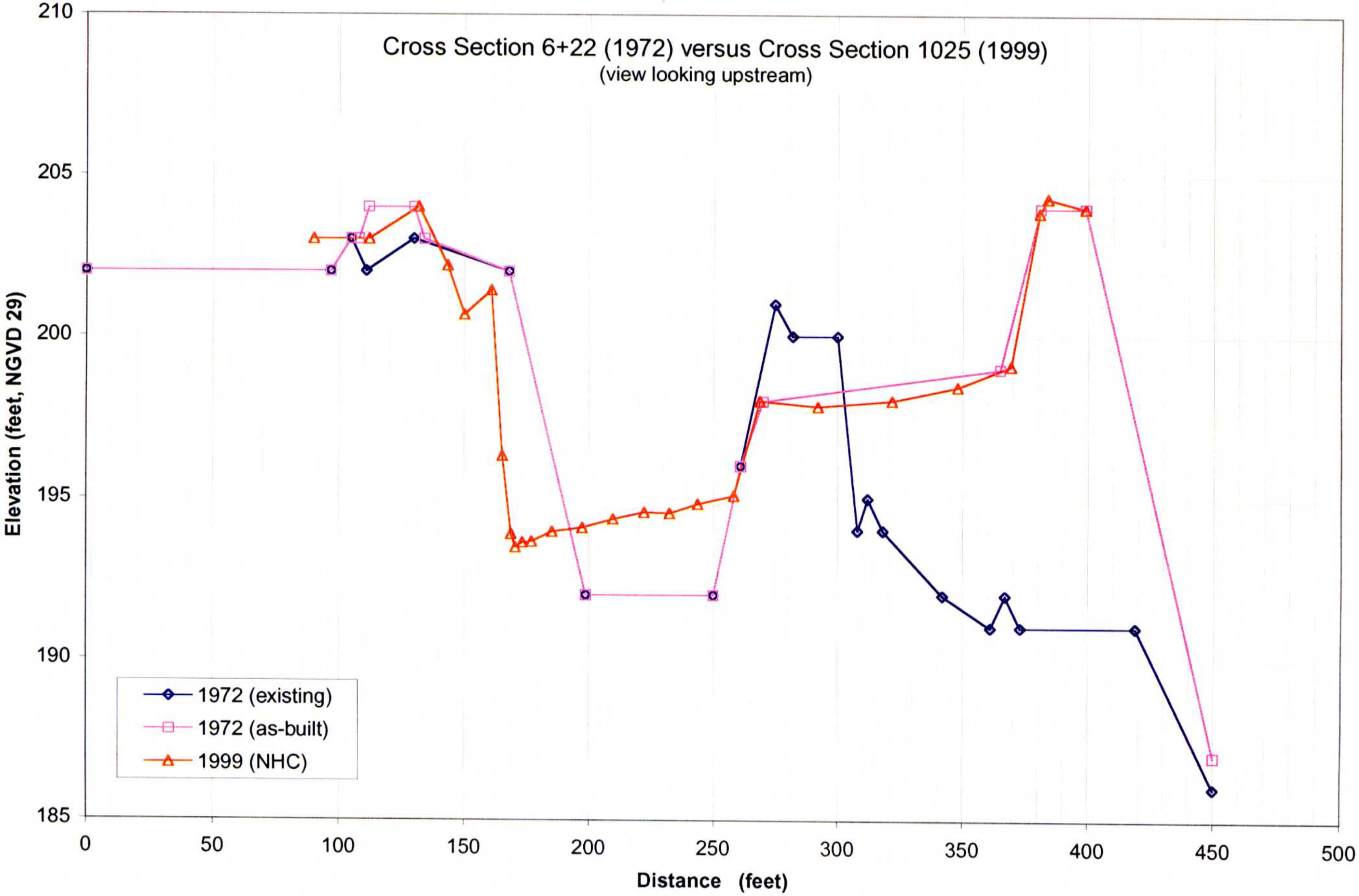


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Figure 3-11
Comparison of 1972 and 1999 Surveyed Cross Sections on Guadalupe Creek at Station 18+00

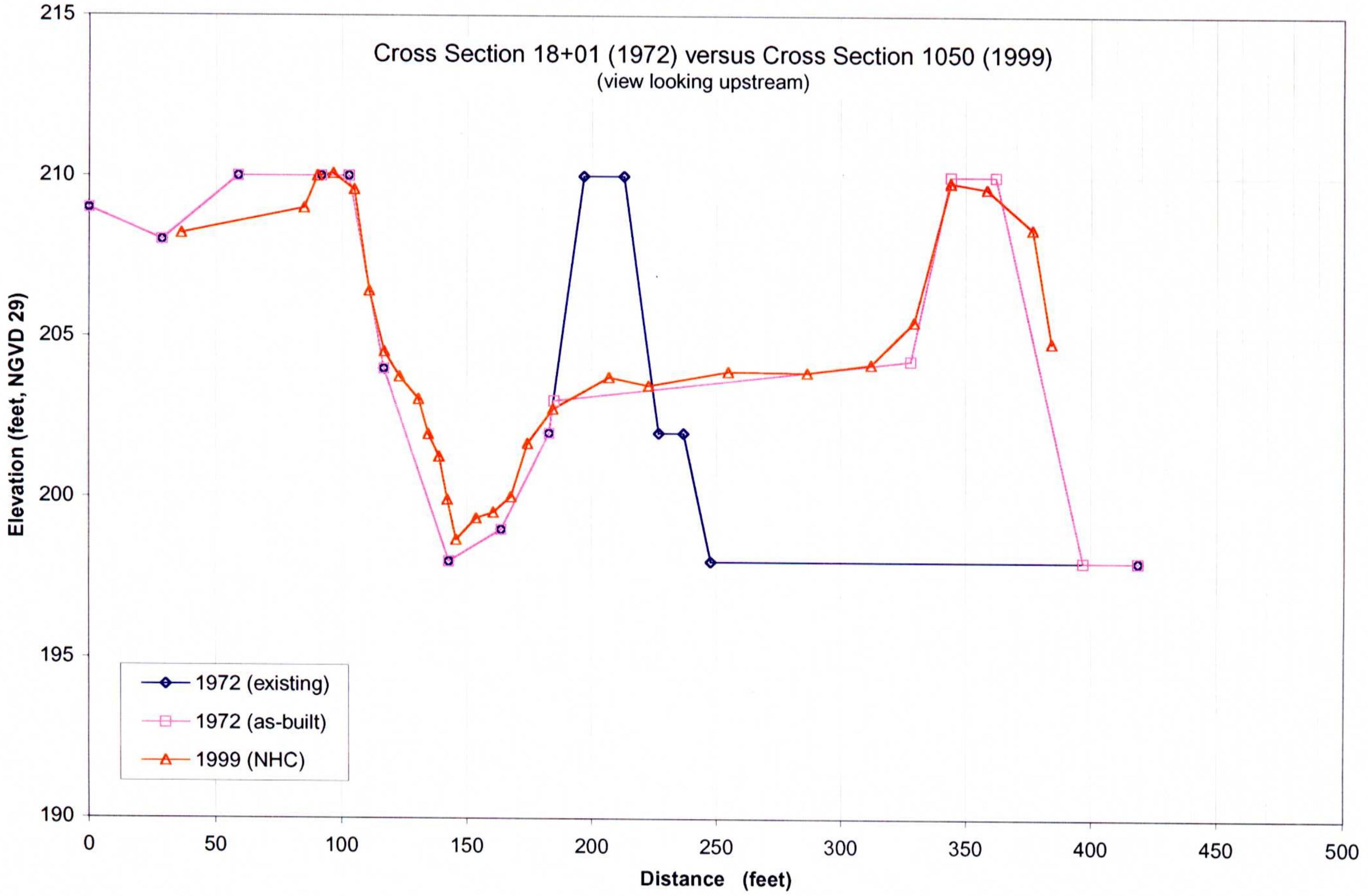

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Figure 3-12
Comparison of 1972 and 1999 Surveyed Cross Sections on Guadalupe Creek at Station 29+20

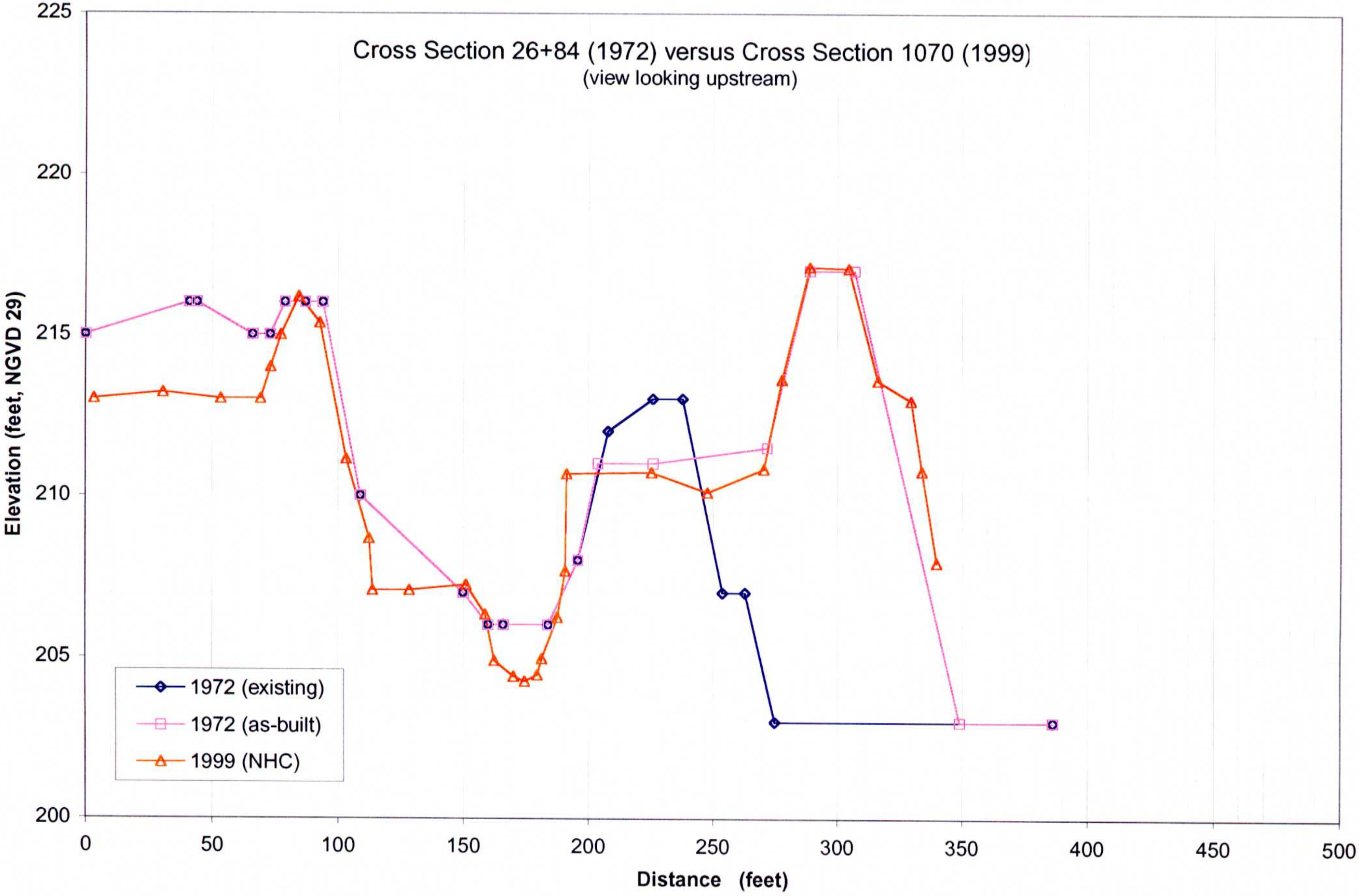

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Figure 3-13
Comparison of 1972 and 1999 Surveyed Cross Sections on Guadalupe Creek at Station 39+20

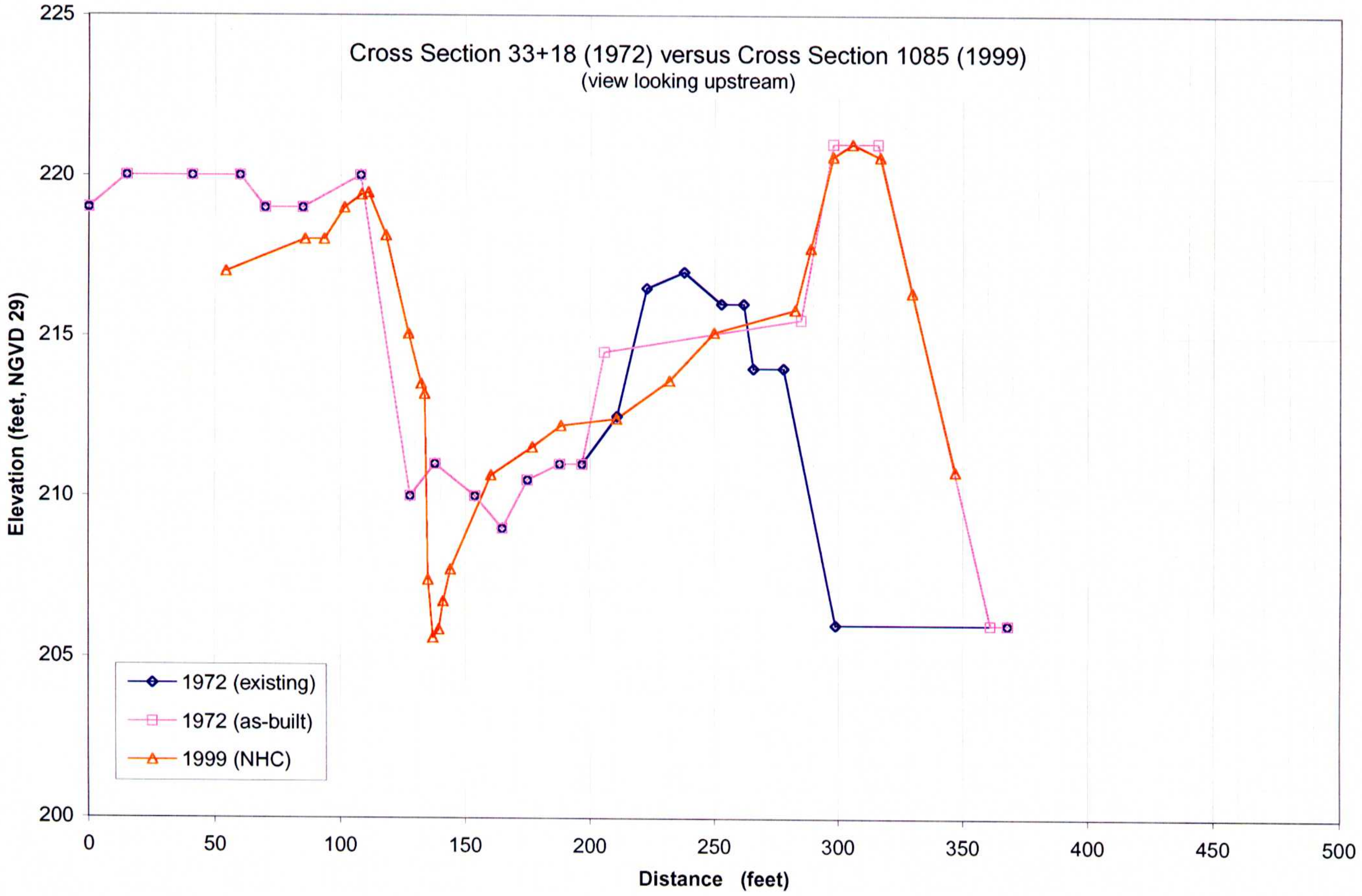

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Figure 3-14
Comparison of 1972 and 1999 Surveyed Cross Sections on Guadalupe Creek at Station 45+20

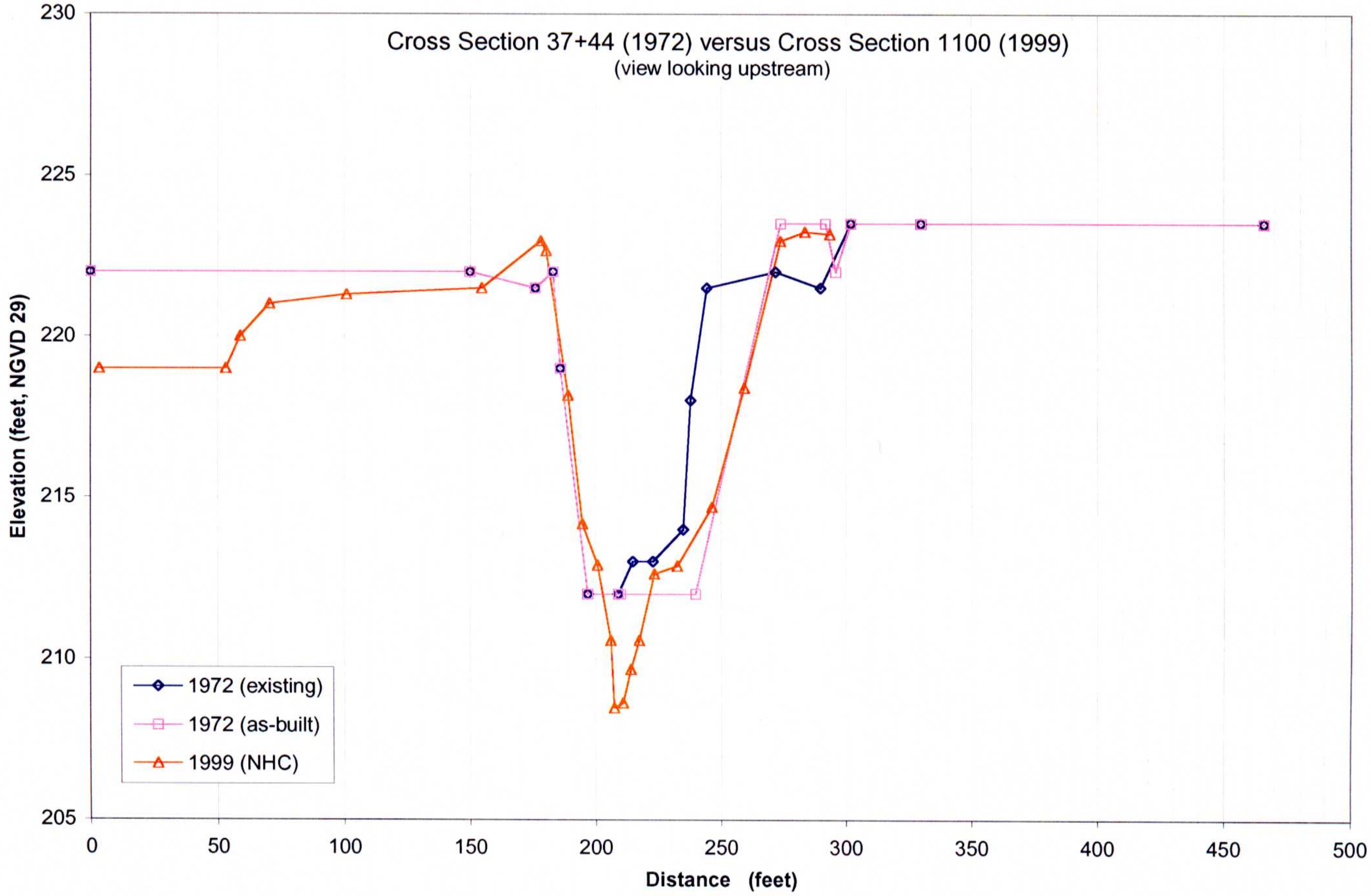

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Figure 3-15
Comparison of 1972 and 1999 Surveyed Cross Sections on Guadalupe Creek at Station 49+40

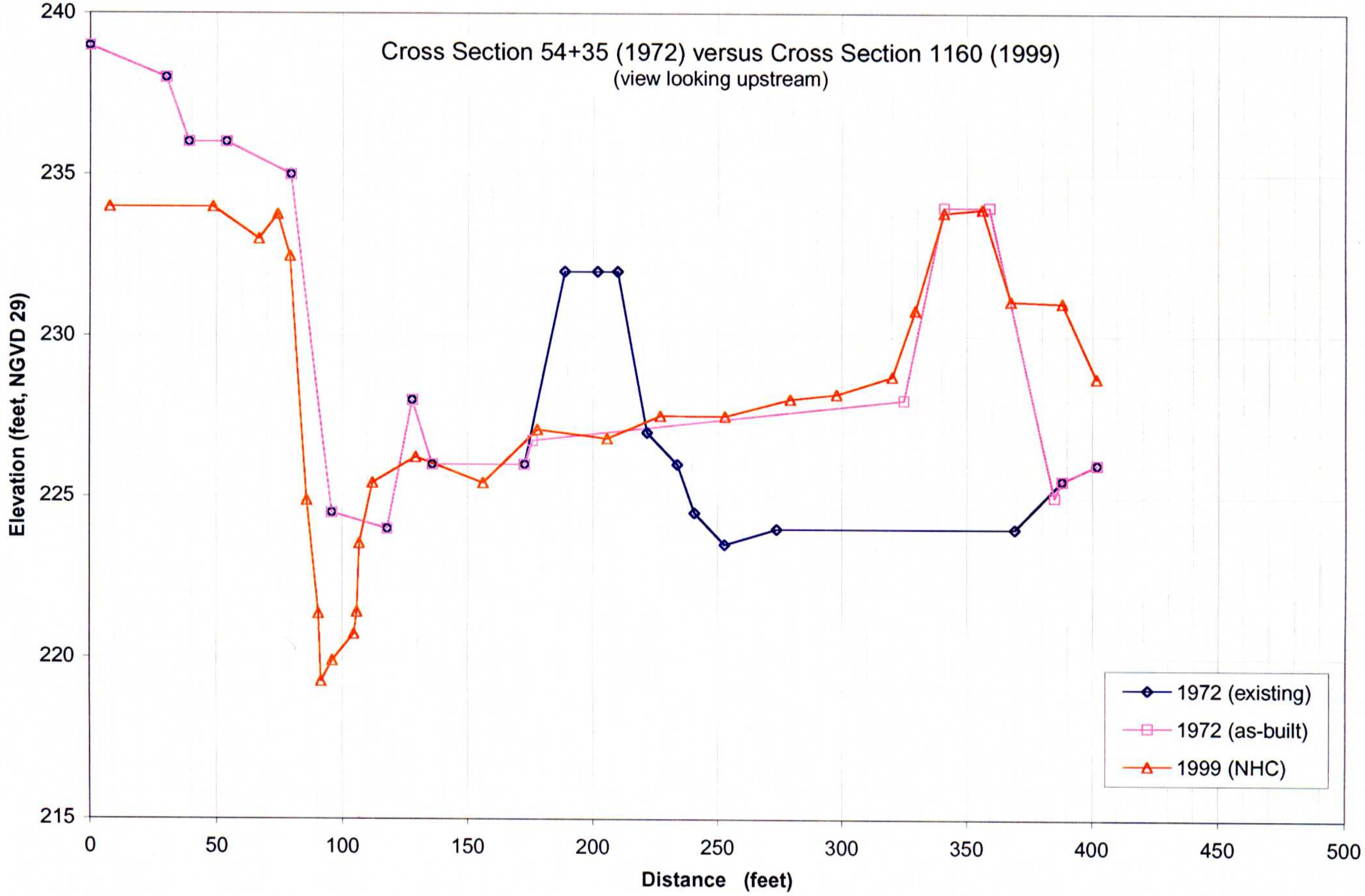

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Figure 3-16
Comparison of 1972 and 1999 Surveyed Cross Sections on Guadalupe Creek at Station 66+40

3.1.1.5 Historical and Future Trends

This portion of the report summarizes historical and ongoing trends in the evolution of lower Guadalupe Creek. Based on the available information, likely future trends in creek evolution are identified.

Historical Trends. Key historical changes that have likely affected channel planform, cross-section, and bed profile through time include channel confinement; gravel mining; levee, bridge, and dam construction; in-channel modifications; and changes in basin hydrology caused by the construction of Guadalupe Dam. In addition, ongoing geologic processes and Holocene climate change may also have caused historical stream adjustment but are much more difficult to quantify. Given that many of these changes occurred during the same or overlapping time periods, it is impossible to distinguish the extent to which each activity affected river morphology. Nonetheless, stream response to specific events, such as instream gravel mining, dam construction, 1962 flood-corridor construction, and 1972 flood corridor expansion, can be identified qualitatively based on current understanding of river geomorphology and hydraulics.

The link between instream gravel mining and stream degradation is well understood (Collins and Dunne 1990). Instream gravel mining on Guadalupe River immediately downstream from Guadalupe Creek began sometime before 1939. Less significant gravel mining also occurred on portions of Guadalupe Creek but probably ended in the early 1960s when a series of percolation ponds was installed along the north bank of the creek. Although specific quantities of gravel extracted are unknown, it is likely that these mining activities, in addition to those on Alamitos Creek, contributed to the 4 feet of channel degradation observed from 1933 to 1972 (Figure 3-9). In contrast, there is little or no change in bed elevation in the lower part of the Project area from 1972 to 1999, indicating that continued mining in Guadalupe River did not cause additional stream degradation on Guadalupe Creek during this period.

The construction of Guadalupe Dam in 1935 resulted in changes to basin hydrology and sediment yield by trapping both water and sediment from the upper Guadalupe Creek watershed. Typically, streams scour and degrade downstream from dams following their construction because flow releases contain little or no sediment in the size classes found in the stream bed. These flows are sometimes referred to as "sediment-hungry". Degradation normally declines with distance downstream from the dam as well as over time. Ultimately, after several larger floodflows, the channel may become armored and increasingly resistant to further degradation, resulting in a new channel equilibrium.

The bed profile from 1972 to 1999 in Figure 3-9 shows a trend toward decreasing channel degradation with distance downstream from Masson Dam. In addition to dam construction, factors that may have contributed to greater channel incision in the vicinity of Masson Dam and in Reach 4 include an historical realignment of the channel sometime between 1948 and 1978 (Site B in Figure 3-5), the addition of revetment along the left bank from about station 81+00 to station 83+00, and a higher sediment transport capacity in Reach 4 than in downstream reaches. The construction of Masson Dam, probably sometime between 1962 and 1964, may have induced downstream bed degradation in a manner similar to Guadalupe Dam, though on a much smaller scale. Channel bed material exhibits large clast sizes in the upper part of Reach 4, which is consistent with armoring of the channel bed caused by stream degradation. However, Reach 4 is also steeper and exhibits a more confined channel cross section, factors which could also contribute the higher clast sizes observed in Reach 4. Examination of 1972 District as-built plans shows that the channel realignment observed at Site B in Figure 3-5 occurred sometime before 1970. This realigned section, as well as channel bank revetment downstream, could also have contributed to channel degradation because the channel was shortened, straightened, and confined, making it more likely to scour in high flows. Channel realignment also appears to have included the formation of two intermediate-level benches, the only ones in Reach 4, both of which have been previously planted by the District in Phase 1 of the Guadalupe Creek Restoration Project (station 86+00 to 90+00).

The construction of a levee and percolation ponds along Guadalupe Creek in the early 1960s resulted in the constriction of creek flows to a narrow flood corridor. Limited by the width of the flood corridor, high flows were no longer able to spread out onto the historic floodplain. Confinement of channel flows would result in higher shear stresses on the channel bed and banks during high flows, promoting scour and stream bed degradation.

The District flood control project in 1972 greatly altered the geometry of the flood corridor as well as the creek channel. 1970 aerial photographs show that the creek channel was nonexistent from Almaden Expressway to station 42+40 during initial phases of the project. Instead, a gravel haul road appears in its place. Whether this road was extended further upstream by the end of construction in 1972 is unknown. Examination of all cross-section data from 1972 as-built plans shows that, of the 69 cross sections in the project area (station 11+00 to station 80+00), 40 show a nearly flat channel bed in the base of the cross section. This finding indicates that the creek channel was poorly defined along most of the project area, either due to surveying techniques or due to significant disturbance of the creek channel during construction. Thus, some of the observed bed profile degradation in Figure 3-9 may be due to surveying methods or the natural formation of a creek channel following construction activities.

Future Trends. Given the historical stability in channel planform (Figure 3-5), generally straight alignment, and low sinuosity of Guadalupe Creek within the Project area, future channel planform shift is expected to continue to occur at a very slow rate. Planform shift will occur along existing areas of bank erosion in the Project area. Bank erosion will be an important concern in areas where the creek is eroding immediately adjacent to existing infrastructure, such as Coleman Road (station 32+00). Higher rates of bank erosion are expected in meander bends that exhibit ongoing erosion of the outer bank, with concurrent gravel bar deposition on the inner bank. The sharp bend at station 47+00 downstream from Meridian Avenue is an example of this type of active meander bend in the Project area.

Historical bed degradation on lower Guadalupe Creek since 1972 has been greatest immediately downstream from Masson Dam (Figure 3-9). In contrast, no instream degradation is observed in the lower part of Reach 1 near Almaden Expressway during this period. Gravel bar accumulation in Reach 1 and bed profile stability since at least 1972 indicate that, barring significant changes to channel geometry or hydrology, the bed elevation in Reach 1 will remain stable in the future. The greatest potential for channel degradation is found in Reach 4, for reasons described in

Historical Trends. In addition, the 1999 removal and reconstruction of Masson Dam could initiate a future phase of channel incision in Reach 4, adding to the existing trend of channel bed decline (Figure 3-9). Channel adjustment would be greatest during the years immediately following dam construction, receding as channel conditions reached a new equilibrium. In addition, Masson Dam has acted as a bed control, preventing stream degradation observed in 1972–1999 from progressing further upstream. Removal of the dam in 1999 may have initiated knickpoint migration and channel incision that has now progressed upstream from the new Masson Dam site.

Examination of historical aerial photographs from 1939 to present shows that there has been little change in the amount of aerial vegetation along the Project area. Similarly, the density and continuity of tree cover along the riparian zone have remained relatively constant for the historical period. In the absence of the Project, future patterns in natural tree and vegetation cover would not be expected to change.

In general, any future instream channel modifications in the Project area, or in some locations downstream, may have an effect on overall stream morphology. Similarly, changes in basin hydrology and water management may result in channel adjustment.

3.1.1.6 Summary and Conclusions

The following conclusions summarize the findings of this geomorphic investigation:

- The Project area can be divided into four geomorphic reaches:
  - Reach 1: Downstream reach dominated by large, alternating gravel bars,
  - Reach 2: Transition reach where channel narrows through Meridian Avenue Bridge,
  - Reach 3: Wide channel reach with large left bank bench, and
  - Reach 4: Confined, narrow reach with steep high banks.
- The Project area shows a decline in the channel bed of between 0 and 9.0 feet for the period 1933 to 1999. Key historical changes that have likely affected channel planform, cross section, and bed profile through time include channel confinement; gravel mining, levee, bridge, and dam construction; in-channel modifications; and changes in basin hydrology. However, given that many of these changes occurred during the same or overlapping time periods, it is impossible to distinguish the extent to which each change actively affected river morphology.
- Historical information and current sediment transport capacity analyses show that the higher potential for future channel degradation can be expected in Reach 4, whereas no future degradation is expected in Reach 1.
- Channel planform has remained very consistent since 1948 No major channel avulsions have occurred and no large-scale meander bend migration was observed. Future changes

in channel planform are expected to occur very slowly. Thus, bank erosion will continue but at a slow to very slow rate.

- Examination of channel cross sections from pre-1972 and post-1972 District construction plans shows substantial changes in channel and floodplain geometry. Most important were:
  - Large increases in levee top width and flood capacity resulting from the reduction in size of percolation ponds and levee setback.
  - Substantial areas of cutting and filling, including the construction of wide benches in the Guadalupe Creek flood corridor.
- Historical aerial photographs from 1939 to 1999 show very little change in the appearance of the wooded riparian zone from Camden Avenue to Almaden Expressway. The consistent decline in the density and frequency of trees from Camden Avenue to Almaden Expressway has been present since at least 1939.

3.1.2 Hydrology

3.1.2.1 Hydrologic Setting

Guadalupe Creek is located in the southern portion of Santa Clara County in northern California (Figure 1-1). The drainage area extends from the headwaters in the Santa Cruz Mountains to the confluence with Alamitos Creek. Elevations within the basin range from 180 feet near the confluence with Alamitos Creek to 3,486 feet National Geodatic Vertical Datum (NGVD) 1929 at the summit of Mt. Umunhum.

Climate. The Project area has a Mediterranean type climate generally characterized by moist mild winters and dry summers. Summertime average maximum temperatures range from 79 to 82 °F, and summertime average minimum temperatures range from 55 to 57 °F. Wintertime average maximum temperatures range from 58 to 62 °F, and wintertime average minimum temperatures range from 41 to 44 °F (Western Regional Climate Center 1999). The measurable precipitation is in the form of rainfall, 85% of which occurs between November and April. Mean annual precipitation ranges from a high of 40 inches near Mt. Umunhum to a low of 16 inches near the confluence of Guadalupe and Alamitos Creeks (Santa Clara Valley Water District 1994).

Watershed Characteristics. The Guadalupe Creek watershed (Figure 3-1) has a total drainage area of 15 square miles. The drainage basin transitions from the steep Santa Cruz Mountains, with slopes ranging from 10 to 75%, to a more mildly sloping alluvial fan. This transition occurs between Camden Avenue and the upstream limit of the Project area at Masson Dam. Upstream from Camden Avenue, the basin is relatively undeveloped. Downstream from

Camden Avenue, the basin is developed primarily in subdivisions of single and multiple family dwellings, with a correspondingly high percentage of impervious cover.

The portion of the watershed upstream from Camden Avenue has a drainage area of approximately 13 square miles. The geology of this portion of the watershed is predominantly Franciscan Complex with outcrops of serpentinized ultramafic rock. As discussed in Section 3.1, the Franciscan Complex is highly erodible and is susceptible to mass wasting processes. Soils within this region are a mix of Los Gatos and Maymen soils. The Los Gatos soil is characterized by gravelly loam with 50 to 75% slopes. The Maymen soil is comprised of rocky fine sandy loam with 50 to 75% slopes. Both soil types are extremely erodible (Soil Conservation Service 1968).

Within the upper portion of the drainage basin, Guadalupe Dam regulates approximately 6 square miles of the upper eastern portion of the drainage area. The tributaries upstream from the dam are Guadalupe, Los Capitancillos and Rincon Creeks. The tributaries downstream from the dam are Dresti, Reynolds, Pheasant, Arnerich, and Shannon Creeks.

The vegetation in the upper watershed consists mainly of hardwoods with an understory of brush, grasses, and forbs. The southwesterly facing slopes tend to be more densely vegetated, whereas the northeasterly slopes are vegetated with fewer trees and more grasses.

The Project area begins at Almaden Expressway, approximately 500 feet upstream from the confluence of Guadalupe Creek and Alamitos Creek and extends upstream approximately 9,000 feet upstream to Masson Dam. This area is located in the lower-most portion of the Guadalupe Creek watershed.

Previous Studies. Hydrologic studies of the Guadalupe River watershed have been performed by the Corps and the District. The District conducted a hydrologic study to estimate peak flows and event volumes for flood facilities in Santa Clara Valley in 1978. In 1994, the District recomputed the 1978 flow frequency analysis for Guadalupe Creek by extending the data set to include measured annual streamflow peaks up to 1992. These results were compared with the results of the 1978 hydrologic analysis. The District concluded that the differences between frequency curves were insignificant (Santa Clara Valley Water District 1994). In 1973, the Corps estimated the 100-year peak flow (i.e., a flood that has a 1% chance of being equaled or exceeded in any one year) to delineate flood hazards along Guadalupe Creek (U.S. Army Corps of Engineers 1973). In 1977 the Corps estimated volume-frequency curves for Guadalupe Reservoir and peak flow frequency relationships for Guadalupe Creek at Guadalupe (SF 43) as part of a hydrologic study for the Guadalupe River and Coyote Creek watersheds (U.S. Army Corps of Engineers 1977).

Available Data. The District operates two streamflow gages on Guadalupe Creek and one within the Los Capitancillos percolation pond system. Figure 3-1 shows the approximate locations of the streamflow gages in the watershed. Streamflow gage 17 (SF 17), located near the base of the dam, measures flows on Guadalupe Creek downstream from Guadalupe Reservoir. Streamflows have been recorded at this gage since 1960. SF 43, operated from 1930 to 1959 by the USGS and from 1960 to present by the District, is located approximately 0.5 miles upstream from Camden Avenue. Dresi, Reynolds, Pheasant, Arnerich, and Shannon Creeks provide seasonal flows into

Guadalupe Creek between SF 43 and the reservoir. The District operates SF 46 at the outlet of the most upstream pond in the Los Capitancillos perculation pond system. Data from this gage are used to estimate the monthly water balance within the Guadalupe distribution system. A summary of the District gage stations is listed in Table 3-4.

Table 3-4. Inventory of Streamflow Gage Data for Guadalupe Creek

Streamflow Gage	Period of Record	Measured Data
17	1960–1990	Maximum and minimum daily stage Maximum and minimum daily discharge Mean daily discharge Daily volume
17	1991–1998	Mean daily discharge
43	1930–1959	Annual peak discharge Mean daily discharge
43	1960–1990	Maximum and minimum daily stage Maximum and minimum daily discharge Mean daily discharge Daily volume
43	1991–1999	Annual peak discharge Mean daily discharge
46	1965–1995	Maximum and minimum daily stage Maximum and minimum daily discharge Mean daily discharge Daily volume
46	1996–1998	Mean daily discharge

In the fall of 1995, the District began collecting hourly water temperature data in Guadalupe Creek at five locations. Temperature gaging stations near SF 17, SF 43, downstream from Masson Dam, and near Almaden Expressway are monitored from late spring to late fall. An additional station upstream from Masson Dam is installed and monitored on a periodic basis.

Water quality data was collected by the USGS on a periodic basis from 1980 to 1991 at SF 43. No measurements of suspended sediment or bedload have been performed on Guadalupe Creek.

Water Management. Guadalupe Reservoir captures flows from Guadalupe, Los Capitancillos, and Rincon Creeks. The reservoir was completed in 1935 as a water supply storage facility and provides ancillary flood control benefits. The reservoir has a total capacity of 3,728 acre feet. Under the Local Cooperation Agreement (LCA) between the Corps and the District, reservoir carry-over volumes for the Guadalupe Creek watershed were established to provide flood storage capacity. Carry-over volumes are measured on December 1. A maximum historic carry-over volume of 2,350 acre feet is prescribed for the Guadalupe Reservoir (Santa Clara Valley Water District 1999). This volume represents 73% of the total reservoir storage capacity. The reservoir has a dead pool storage of 67 acre feet and an additional 500 acre feet is reserved as a fish pool. The working pool storage for water supply and flood control is 3,228 acre feet. The Guadalupe Reservoir capacity is regulated as part of the LCA to provide flood control for the Guadalupe River. The District uses a combined storage rule curve to regulate outflows from several reservoirs, including Guadalupe Reservoir, that are tributary to the Guadalupe River. At stages below the spillway crest, flows are regulated at the Guadalupe Dam through a 36-inch-diameter pipe. The maximum flow through the outlet orifice is 235 cfs.

The Guadalupe Creek watershed serves as a significant source of water for Santa Clara County. The District manages the water produced from the basin for water supply and flood control purposes. Figure 3-17 shows a schematic of the Guadalupe Creek water distribution system. The District maintains water rights and licenses that allow for the diversion of a maximum of 4,052 acre feet per year from Guadalupe Creek. Between December 1 and April 30, the District may divert 3,500 acre feet at Guadalupe Dam. A second license allows the District to divert 0.77 cfs from October 1 to May 1 from Guadalupe Creek. In addition, the District can divert 323 acre feet of local runoff between October 1 and May 1 at Masson Dam. These diversions are subject to Department of Fish and Game Code 5937, which requires the District to maintain flows for fish habitat (Aguilera 2000).

The reservoir is operated primarily to provide flows for groundwater recharge in the Los Capitancillos percolation ponds and in the bed of Guadalupe Creek in the Project area. Upstream from the Project area, Masson Dam is used to regulate the diversion of flows from the creek into the percolation ponds. Flashboards at Masson Dam are removed during the flood season if Guadalupe Reservoir reaches capacity. The flashboards are reinstalled in April at the end of the flood season. Water can be imported to and exported from Guadalupe Creek through the Almaden Valley pipeline. Imported water from the Almaden Valley pipeline, if available, can provide an additional source of water to the percolation ponds and the creek. Flows from the pipeline can be imported into Guadalupe Creek at Masson Dam. Masson Dam is currently being reconstructed to incorporate a fish ladder for fish passage, and the main dam structure has been removed from the creek.

The Los Capitancillos percolation ponds are supplied by water from Guadalupe Creek and the Almaden Valley pipeline. Flows diverted from the Almaden Valley pipeline to the Guadalupe Creek water distribution system are regulated and measured at Turnout 14 (Figure 3-17). The flow from the pipeline can be diverted to the percolation ponds or Guadalupe Creek at the junction box near the outlet of the turnout. Conversely, Guadalupe Creek flows can be diverted from the creek to the ponds at Masson Dam. Flow diversions to and from the creek at Masson Dam are not gaged and are estimated by maintenance and operations personal on a daily basis (Aguilera pers. comm.).

These estimates are reviewed to estimate mean monthly diversion volumes and water balance within the distribution system.

3.1.2.2 Flow Frequency

The probability of a specified peak flow occurring in any given year can be calculated by applying statistical methods to measured annual peak flows to produce a flow frequency relationship. A flow frequency analysis was performed to develop design flows for the Guadalupe Creek Restoration Project. These flow estimates were developed solely for use in this Project and are not intended to revise previous estimates for flood control or water supply purposes. Peak flows for the 1.5-, 2-, 5-, 10-, 50-, and 100-year flood events were calculated for use in the preproject hydraulic model. Additionally, these flow estimates will be used in the Project hydraulic models to evaluate and design postproject hydraulic characteristics.

Annual peak flow data measured at SF 43 for water years 1930 to 1999 were used to estimate a flow frequency relationship for Guadalupe Creek. A histogram of the annual peak flows is shown in Figure 3-18. The peak flow of record was 2,770 cfs and occurred on March 10, 1995. The minimum annual peak flow of 7 cfs occurred March 15, 1977.

The frequency analysis was performed using the Corps Hydrologic Engineering Center (HEC)-FFA software package (HEC 1992). The software is a modified application of the procedures prescribed in the Guidelines for Determining Flood Flow Frequency (U.S. Geological Survey 1982). A log-Pearson Type III probability distribution is fitted to the data. The length of the systematic record, 70 years, is one of the longest continuously operated streamflow gages in the area. The sample size is of sufficient length to assume that application of a regional skew would not improve the estimates compared to use of the computed skew from the period of record. The data was plotted using a general formula for computing plotting positions as described in USGS Bulletin 17B (U.S. Geological Survey 1982). Constants A and B in the general formula were set equal to 0.4 as recommended by Cunnane (1978). The plotting position formula is used to plot the data graphically but does not affect the computation of the flow frequency relationship.

The flow frequency analysis was not adjusted to account for the effect of Guadalupe Reservoir on peak flows. The reservoir regulates approximately 6 of the 12.8 square miles tributary to SF 43. The storage capacity of the reservoir will attenuate flood peaks, through the reservoir to varying degrees, depending on reservoir storage prior to the event. The District used an initial reservoir storage volume prior to the 1% design flood of 2,900 acre feet. This volume is approximately 90% of the working reservoir storage. As stated by the District, "Since the storage capacity of the reservoir is relatively small, it was assumed to have minor effect on the peak flows at the gage" (Santa Clara Valley Water District 1994). The flow frequency curve developed from annual peak flow data at SF 43 includes the effects of reservoir regulation over the 65-year period that the reservoir has been in place. For the purposes of this Project, the effect of the reservoir on nonrandomness of the data is considered insignificant. Application of the flow frequency relationship from SF 43 provides an effective and reasonably accurate means to update existing

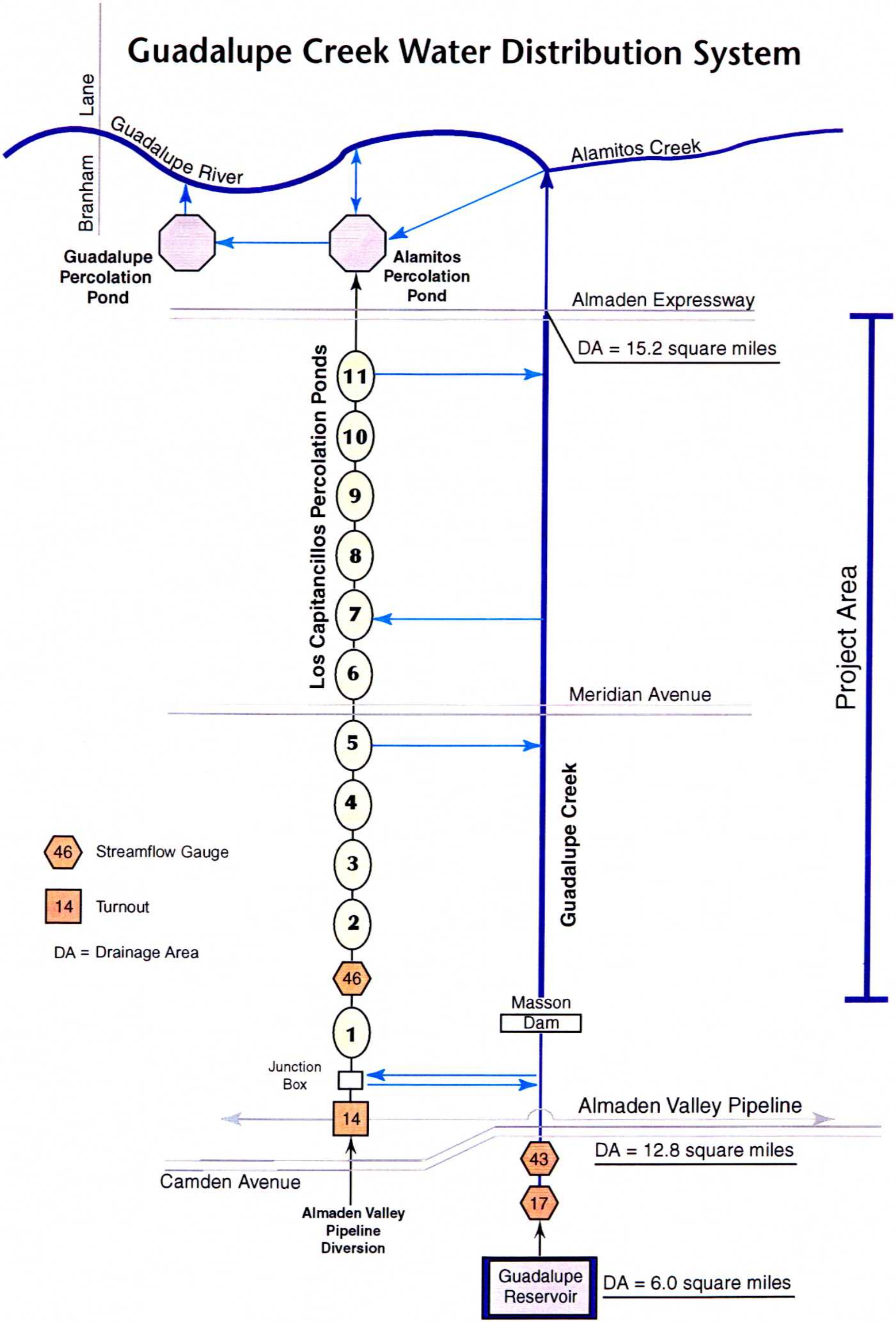
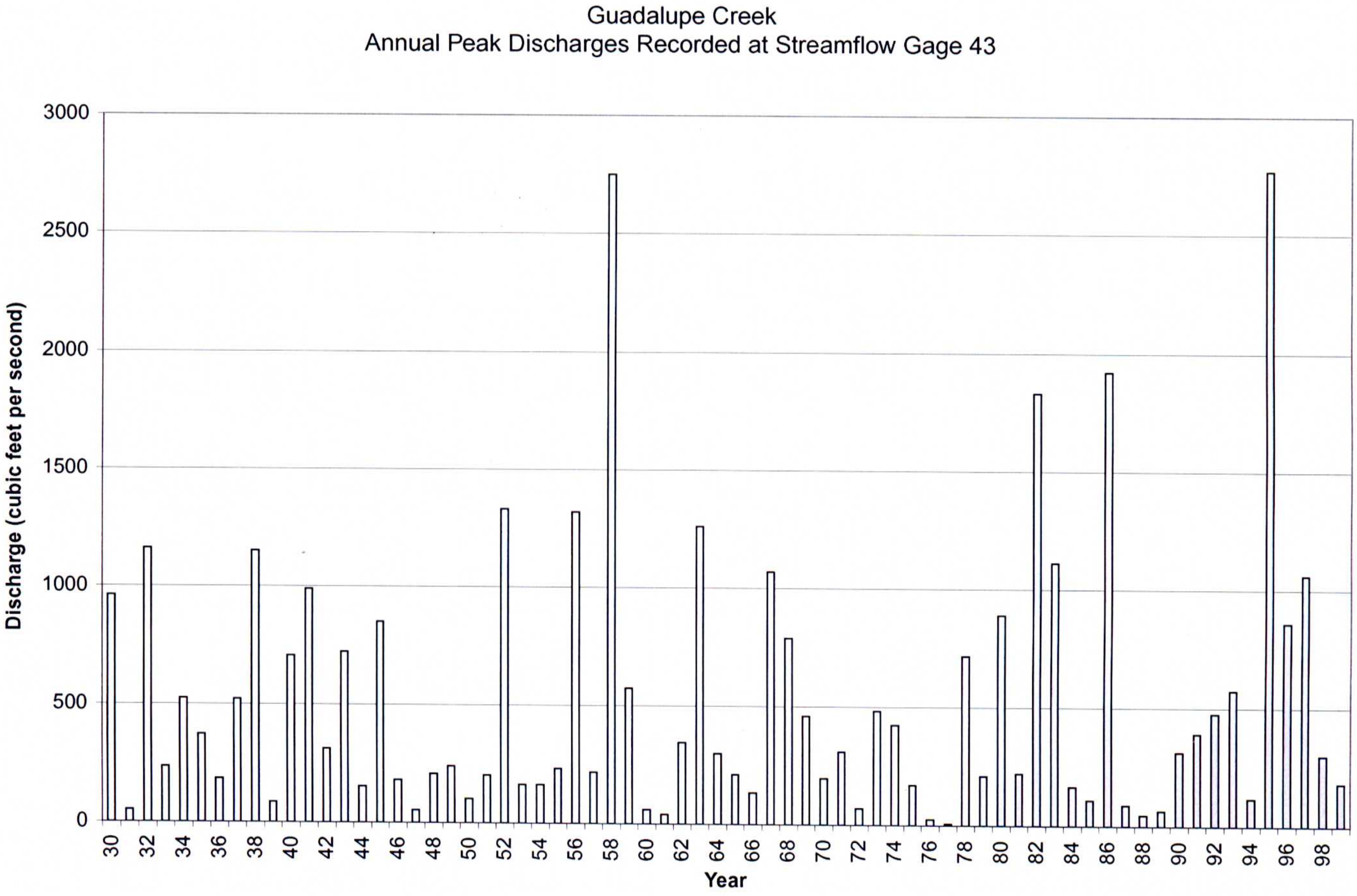


Figure 3-17
Guadalupe Creek Water Distribution System



Jones & Stokes
nhc

Figure 3-18
Annual Peak Discharges Recorded at Streamflow Gage 43

frequency estimates for a full range of flood flows. However, its application outside of this Project is not recommended without consideration of the uncertainties involved

The flow frequency and annual peaks are plotted on Figure 3-19. The 1977 annual peak flow of 7 cfs was below the low outlier threshold and was omitted from the data set. The data plots within the 5 and 95% confidence limits and is considered to have an acceptable fit with the expected probability curve. The peak flow of record is near the 95% confidence limit. Table 3-5 shows a comparison of the flood discharge estimates developed by the Corps, the District, and NHC. Flows computed for this study generally match the flows developed by the Corps and the District. The NHC 1.5-year peak flow through the 5-year peak flow are approximately 2–5% lower than the District and Corps flows. The 10-year flow is approximately 16% lower than the District flows. Conversely, the 50- and 100-year NHC peak flows are 14 and 29% higher than the District flows.

3.1.2.3 Flow Duration

Statistical analyses may be performed on data compiled in a historical time series to determine exceedance probabilities. Frequency information developed from historical time series data is commonly shown in a flow duration curve. This flow duration relationship is particularly useful in analyzing lower flows that affect the establishment of improved fish habitat and vegetation in the Project area. Flow magnitudes and durations influence the channel morphology and plant communities through the disbursing of seeds, wetting of channel surfaces and adjacent soils, sorting of material composing the bed, transport and deposition of sediment and debris, and numerous other physical and biological processes.

Table 3-5. Peak Flow Comparison for Guadalupe Creek

	Guadalupe Creek				Guadalupe River
Return Period, Year	Guadalupe Creek Restoration Study[a]	U.S. Army Corps of Engineers, 1973[b]	U.S. Army Corps of Engineers, 1977[a]	Santa Clara Valley Water District, 1994[a]	Santa Clara Valley Water District, 1978
1.5	190	NA	210	200	400
2	320	NA	340	340	880
5	790	NA	830	810	3000 [c]
10	1270	NA	1300	1500	5400
50	2900	NA	2700	2500	9900 [c]
100	3880	3000	3500	2800	11800

Notes:

[a] At streamflow gage (SF) 43.

[b] At Confluence with Alamitos Creek.

[c] Graphically interpolated from Guadalupe River downstream from Alamitos Creek and Guadalupe River upstream from Ross Creek discharge estimates.

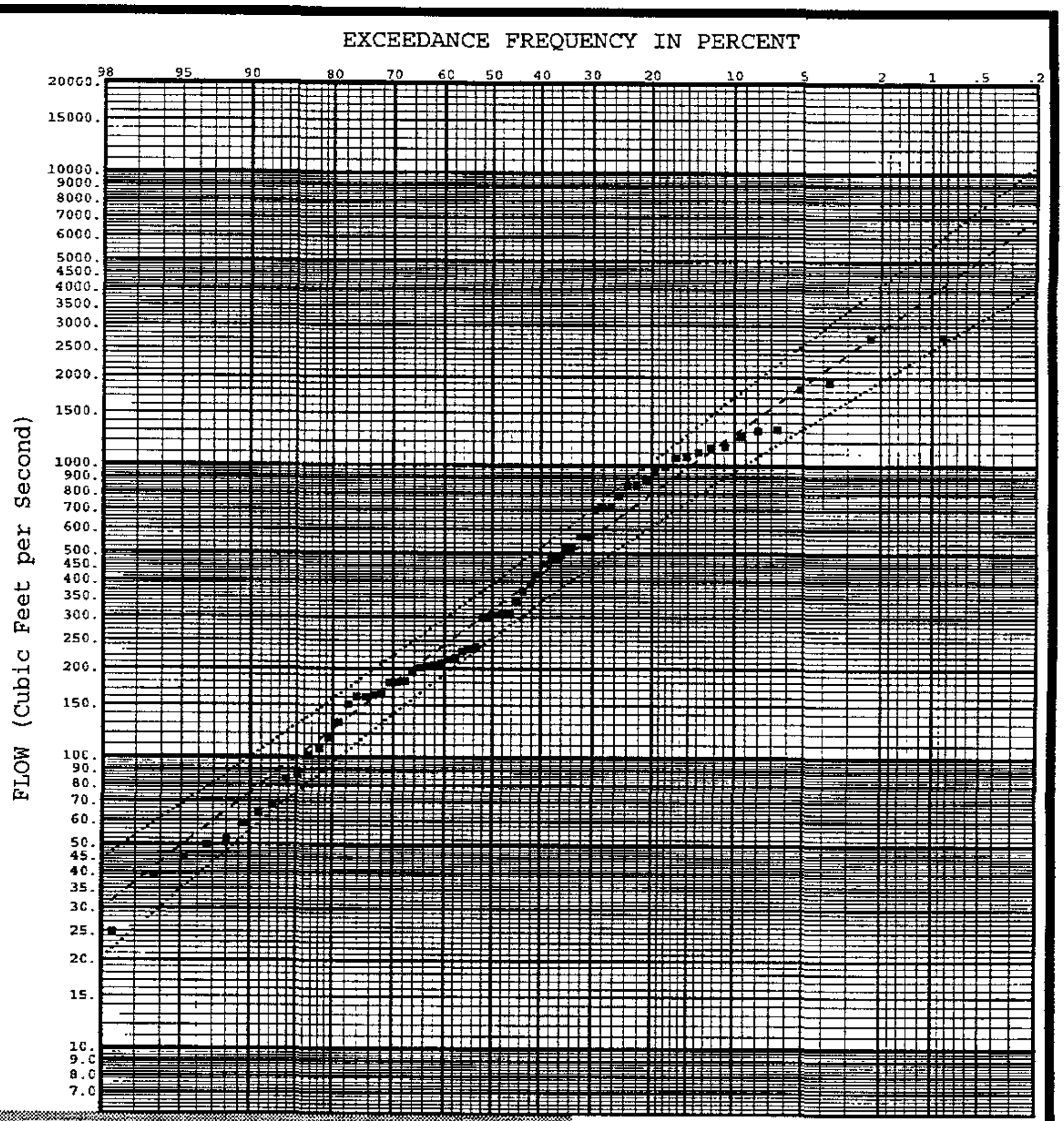
NA = Not available.

Flow data are available for Guadalupe Creek at SF 43, but not in the Project area. The District maintains flows of 3–4 cfs downstream from Masson Dam to comply with DFG regulation for maintaining a live stream and to provide water for groundwater recharge through the creek bed in the Project area. Approximately 2.5–3.5 cfs of this flow infiltrates into the subsurface between Masson Dam and Almaden Expressway. The District attempts to maintain a minimum of 0.5 cfs in the creek at Almaden Expressway (Aguilera pers. comm.). During extended dry periods, the storage capacity of the Guadalupe Reservoir is not sufficient to maintain flows in the creek for the entire year. In this case, water may be imported via Almaden Valley pipeline. However, this source of water is not reliable in all years (Ricko pers. comm.).

Daily flows within the Project area cannot be determined directly, but mean daily streamflow records at SF 43 are available. The flow duration relationship provides a useful basis for estimating flow in the Project area in combination with information from District operations. Therefore, data at SF 43 were used to determine a flow duration relationship for the creek upstream from Masson Dam, based on SF 43 mean daily flow records for water years 1931–1998. The flow duration analysis includes the effects of regulation at Guadalupe Dam. The flow releases at the dam control flows in the creek for all but the wet periods of the year where unregulated portions of the basin produce the majority of the measured flows at SF 43. Regulated releases from the dam typically range from 2 to 10 cfs. Higher releases are made during the wet season to maintain flood storage capacity.

The flow duration curve is shown on Figure 3-20. The analysis indicates that flows greater than 11 cfs are exceeded only 10% of the time. Approximately 85% of the time flows are greater than 3 cfs, the flow that the District attempts to maintain in the creek downstream from Masson Dam. This analysis suggests that the District must import water from alternative sources 15% of the time or more to maintain desired flows in the creek and percolation ponds. During the drought of the mid 1970s, there were no recorded flows at SF 43 (or at SF 17) between June 1977 and the end of October 1978.

Comparison of streamflow records between SF 17 and SF 43 indicate that flows in Guadalupe Creek downstream from SF 43 are dominated by reservoir releases and water management practices in the late summer and fall. Streamflow records at SF 17 and SF 43 were compared for several water years (1976, 1978, 1986, 1991, 1995, 1996, and 1998) representative of various hydraulic conditions. In all water years reviewed, flows at SF 17 were greater than or equal to flows at SF 43 during September and October. In most of the water years, streamflow records at SF 43 were greater than SF 17 only during the wet part of the year. These observations suggest that tributaries downstream from Guadalupe Reservoir do not contribute flows to the creek in late summer and fall. Given that the relatively low flows at SF 43 are maintained by reservoir releases during the summer and late fall, and that operational information from the District indicates that the Project area infiltrates a substantial portion of the regulated flows, at least a portion of the creek in the Project area would typically be dry in late summer and fall without District water management operations. This view of the creek in the Project area as a naturally ephemeral stream is supported by historical evidence such as government survey notes from the 1860s that describe the channel as a dry arroyo (Thompson 1865).



- - - Flow Frequency (with Expected Probability)
■ User-Defined Positions
······· 5% and 95% Confidence Limits

FREQUENCY STATISTICS

LOG TRANSFORM OF FLOW, CFS		NUMBER OF EVENTS	
MEAN	2.4960	HISTORIC EVENTS	0
STANDARD DEV	.4715	HIGH OUTLIERS	0
SKEW	-.0957	LOW OUTLIERS	1
REGIONAL MAP SKEW	--	ZERO OR MISSING	0
ADOPTED SKEW	-.1000	SYSTEMATIC EVENTS	70

GUADALUPE CREEK
AT GUADALUPE, CA
BASIN AREA = 12.8 *Square Miles*

Figure 3-19
Annual Flow Frequency Curve for Streamflow Gage 43

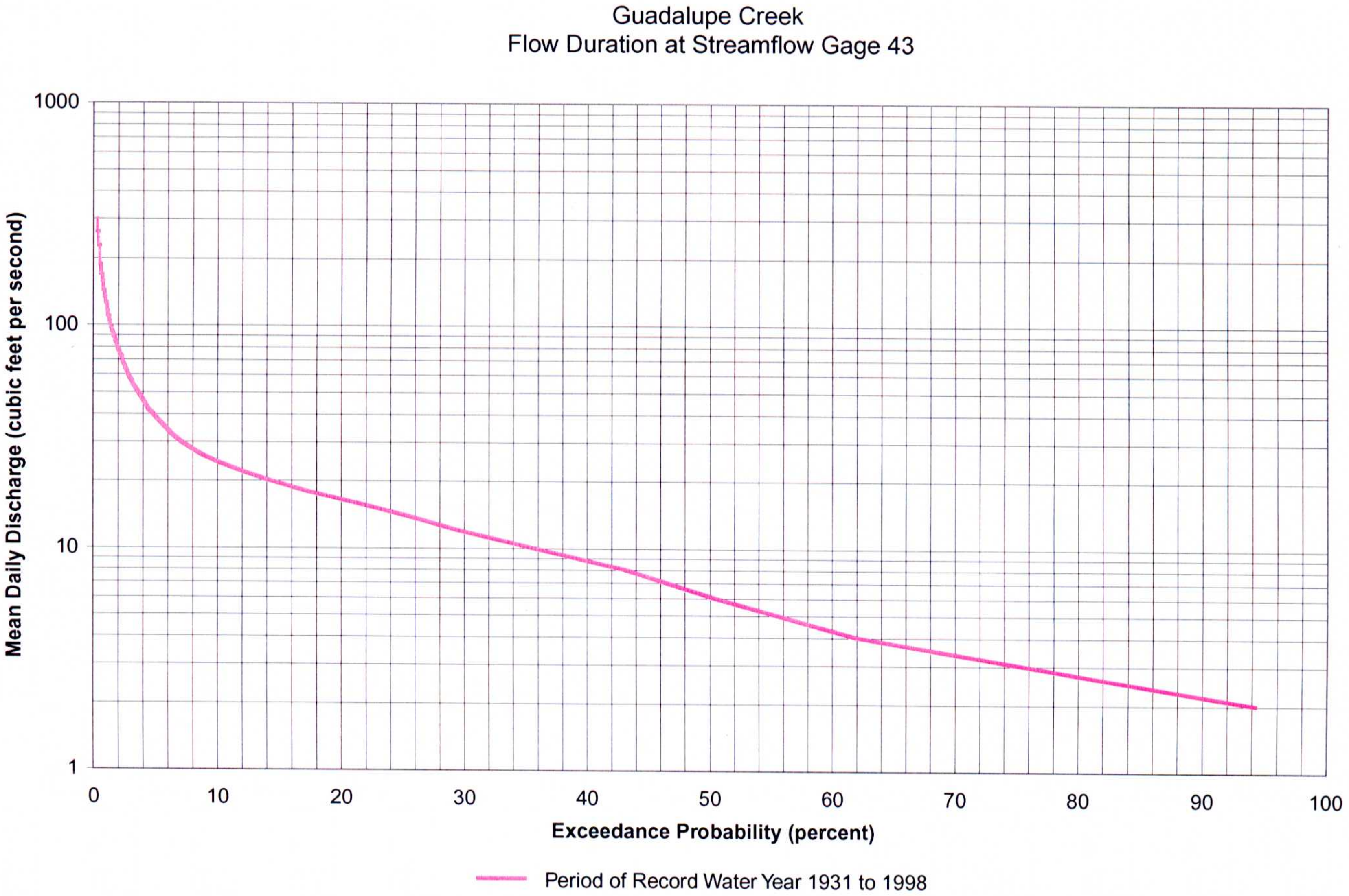


Figure 3-20
Flow Duration Curve for Streamflow Gage 43

3.1.3 Hydraulics

3.1.3.1 Introduction

Previous hydraulic studies on Guadalupe Creek have been developed by the District and the Corps to estimate flood capacity and flood hazards. The District developed a HEC-2 model using cross-section geometry from the topography shown on the 1972 as-built plans for the channel construction along Guadalupe Creek (Santa Clara Valley Water District 1972). The model was developed to estimate channel capacity and potential effects of channel maintenance activities (Rieller pers. comm.). The Corps calculated a flood profile to use in the 1973 flood hazard study (U.S. Army Corps of Engineers 1973). The report does not include support data or methodology used in the study.

The purpose of the hydraulic analysis conducted for this Project is to estimate preproject hydraulic conditions for a range of flows. Hydraulic characteristics, such as velocities, depths, channel widths, and energy slopes, developed from the preproject models have been used to assess current channel stability and develop suitable project approaches and alternatives.

Changes in channel geometry and vegetation characteristics from 1973 to 1999 warranted development of an updated hydraulic model to estimate hydraulic characteristics. The preproject conditions were modeled using HEC-RAS (Hydrologic Engineering Center 1998), a one-dimensional, steady-state, gradually varied flow model. This model will be used during final design of the Project to evaluate proposed channel and floodplain modifications.

3.1.3.2 Creek Description

Descriptions of the creek planform and cross-section characteristics are presented in detail in Section 3.1.

Vegetation types and densities vary across the creek as well as longitudinally along the creek. Along the waters edge within the main flow channel, aquatic vegetation exists on a seasonal basis and is susceptible to removal by seasonal high flood events. Adjacent to the low-flow channel, the vegetation density varies from unvegetated bars to dense willow and shrub/vine scrub. Vegetation along raised benches tends to be sparsely vegetated. Vegetation on the bench surfaces include annual grasses and shrubs with occasional trees.

3.1.3.3 Model Setup

A HEC-RAS model was developed for the 1.5-, 2-, 10-, 50-, and 100-year peak flows. A modified version of the model was developed for low flows, from 5 to 100 cfs, to account for differences in depth and roughness characteristics at these flows. Data required to model the creek with HEC-RAS include cross sections of channel and floodplain geometry, channel roughness estimates in the form of a Manning's roughness coefficient, geometric data on structures that may act as hydraulic controls (e.g., bridges), estimations of the effective conveyance areas, event flows developed from the flow frequency analysis, and flow estimates for typical low-flow periods. Many of the input parameters in the high- and low-flow models are similar. These parameters include cross-section geometry and bank station locations. Channel roughness values were adjusted in the low-flow model to account for the increased effect of bed roughness and vegetation at lower flows.

Cross Sections. Cross sections for the Project were surveyed by NHC in November 1999 at 100–300 feet intervals along Guadalupe Creek. Forty nine cross sections were surveyed from the downstream face of Almaden Expressway Bridge upstream to approximately 60 feet downstream from Masson Dam. Control points consisting of aluminum caps over ½-inch rebar were set on the north levee at an interval of one every other surveyed cross section. Additional survey data for the Almaden Expressway and Meridian Avenue Bridges included top of bridge, soffit, pier locations, and widths. In addition to the NHC sections, five cross sections were surveyed by the District downstream from the Project area in December 1999. These sections extend from the Alamitos drop structure to the Almaden Expressway Bridge. Both surveys used NAD83 as the horizontal datum and NGVD29 as the vertical datum. The stationing convention for the Project area is based on the approximate centerline of the low-flow channel. Station values are based on the 1973 Corps Flood Plain Information Report profile stationing. Appendix B depicts the longitudinal stationing, cross-section locations, and orientation for the Project area.

Cross-section data used in the models include NHC- and District-surveyed cross sections and three cross sections cut from aerial topography (Aelytec 1999), sections 1057, 1077, and 1183. The cross-section labeling in the model is independent of the longitudinal creek station. Cross sections surveyed by the District were labeled from downstream to upstream beginning with 100 and ending with 150. Labels for cross sections surveyed by NHC increase with distance upstream, beginning with 1008 at the downstream face of Almaden Expressway and ending at 1270. Cross sections in the model are laid out following the District convention of looking upstream from left to right.

Bridges. Upstream and downstream from the bridges, standard step calculations were used to compute the energy and water-surface elevations. Low flows through the bridges were calculated using both the standard step method and the Yarnell equation. The method with the greatest energy loss through the bridge was used to compute the water-surface profile. Pressure-flow equations were used to calculate the energy loss through the bridge when the energy grade equaled or exceeded the elevation of the soffit.

Roughness. Manning's '*n*' was used to define the roughness of the channel and overbank areas. Surface roughness, vegetation characteristics, irregularities in geometry, and flow depths were used to estimate preproject Manning's n. Roughness values for Manning's *n* varied from 0.035 in areas of sparse vegetation and/or annual grasses to a high of 0.15 at a dense willow stand at cross section 1090.

Bank Stations. Bank stations were set at locations to define the approximate boundaries of the main flow corridor of the creek. This corridor was identified through the use of topographic data superimposed on aerial photographs, cross-section data, and field observations.

Levee Stations. HEC-RAS levee stations were used in the model to define the lateral boundaries of the creek. The levee function in HEC-RAS confines the conveyance area to the area between the levees until an iterative computation of the water-surface elevation is greater than the top of the levee. When the levee is overtopped, the model recomputes the water-surface elevation using the areas on both sides of the overtopped levee as conveyance area.

Ineffective Flow Limits. Ineffective flow areas can be set in HEC-RAS to define the active cross-sectional conveyance area. Ineffective areas often occur where there are large variations in the cross-section width between adjacent upstream and/or downstream sections. Ineffective areas were specified in cross sections 1210–1270 to delineate areas in active conveyance along a broad bench on the south side of the channel 2. This approach was used to estimate velocities and depths to be used in the development of alternatives. An ineffective flow limit was also placed on the northerly bench at cross section 1175 to model flow expansion.

Flow Classification. The model extends downstream from the Project area to the Alamitos Weir on the Guadalupe River. The model was set up to compute subcritical flow at each cross section. Field observations and experience suggest that supercritical flow conditions would not occur over an appreciable distance.

Starting Water Surface. Starting water-surface elevations for all flows were based on critical flow at the Alamitos drop structure crest. Modeled flows increase in the Guadalupe River reach between the Alamitos drop structure and the confluence of Guadalupe and Alamitos Creeks.

3.1.3.4 HEC-RAS Model Results

Introduction. The purpose of developing a hydraulic model of the Project area is to estimate hydraulic characteristics for several steady-state flows. Reach-averaged hydraulic characteristics were computed and used to estimate the capacity of the creek and calculate sediment transport potential. Additionally, these results were compared with geomorphic observations and used to illustrate the differences between the geomorphic reaches. These analyses were used in developing design objectives and criteria. The computed water-surface profiles were compared with previous District and Corps water-surface profiles.

Model Stability. In general the model produced flow depths and velocities that are typical of unlined vegetated channels with similar characteristics. However, computed water surfaces at some locations for various flows did not converge to a subcritical solution and defaulted to a minimum energy solution. Physical characteristics of the creek, such as steep channel slopes, abrupt changes in channel geometry, and vegetation, may result in the occurrence of critical flow conditions at discrete locations along the creek during an actual runoff event.

Model Calibration. High water marks were collected at 10 locations along the Project area following the peak flow of 535 cfs February 14, 2000. This flow has a return period of approximately 3 years. Computed water-surface elevations at this flow were compared with actual water-surface elevations to determine the accuracy of the model. For the Project area downstream from cross section 1120, the model results were within 0.2 feet of the highwater marks. The computed water-surface elevations were 0.8–0.7 feet above the highwater marks measured at cross sections 1140 and 1160. At cross section 1185 the model defaulted to a critical depth solution. The default solution at cross section 1185 was 0.5 feet below the measured highwater mark.

Model Results. Hydraulic characteristics were calculated for the 1.5-, 2-, 5-, 10-, 50-, and 100-year peak flows. The model results are shown in Table 3-6. The 1.5-, 2-, and 5-year peak flows are conveyed through the channel without appreciable backwater effects resulting from channel constrictions or bridges. The confluence of Guadalupe and Alamitos Creeks, Alamitos Expressway Bridge, and Meridian Bridge act as hydraulic controls, causing backwater in the 10-, 50-, and 100-year water-surface profiles to upstream from these controls.

Water-surface profiles for the 2-, 10-, and 100-year peak flows are plotted on Figure 3-21. Average velocities for the entire cross section are plotted for the 2-year and 100-year peak flows in Figure 3-22. These values are highly variable from cross section to cross section; however, the plots show a decreasing trend in the downstream direction.

The active top width is defined as the top width within the effective flow limits. Active top widths for the 2- and 100-year peak flows are plotted in Figure 3-23. As shown in the figure, the 2-year flow has a relatively consistent top width that increases in the downstream direction. The 2-year peak flow is confined within the main channel throughout the Project area. Changes in width from cross section to cross section become larger with increasing flow. As the flow increases, water spreads out laterally across the benches; at higher flows, changes in top width become a function of the bench geometry. The main channel confines the 1.5- and 2-year events at every cross section. Higher flows, such as the 10-year flow, vary from cross section to cross section between confinement within the main channel and flow in both the main channel and on the bench. The 50- and 100-year flows are confined to the main channel in a few locations, such as downstream from Meridian Bridge.

Four subreaches were defined within the Project area by identifying regions of distinctly similar geomorphic characteristics. A discussion of these delineations is provided in Section 3.1 of this report. Computed hydraulic characteristics correspond well with the distributions between geomorphic reaches.

Reach-averaged characteristics of the main channel were computed for velocity, hydraulic depth, and width. These parameters were weighted by reach distance. An average energy slope for the reach was computed by subtracting the energy grade at the upstream end of the reach from the energy grade at the downstream end of the reach and dividing by the reach distance. Table 3-7 shows the reach-averaged characteristics.

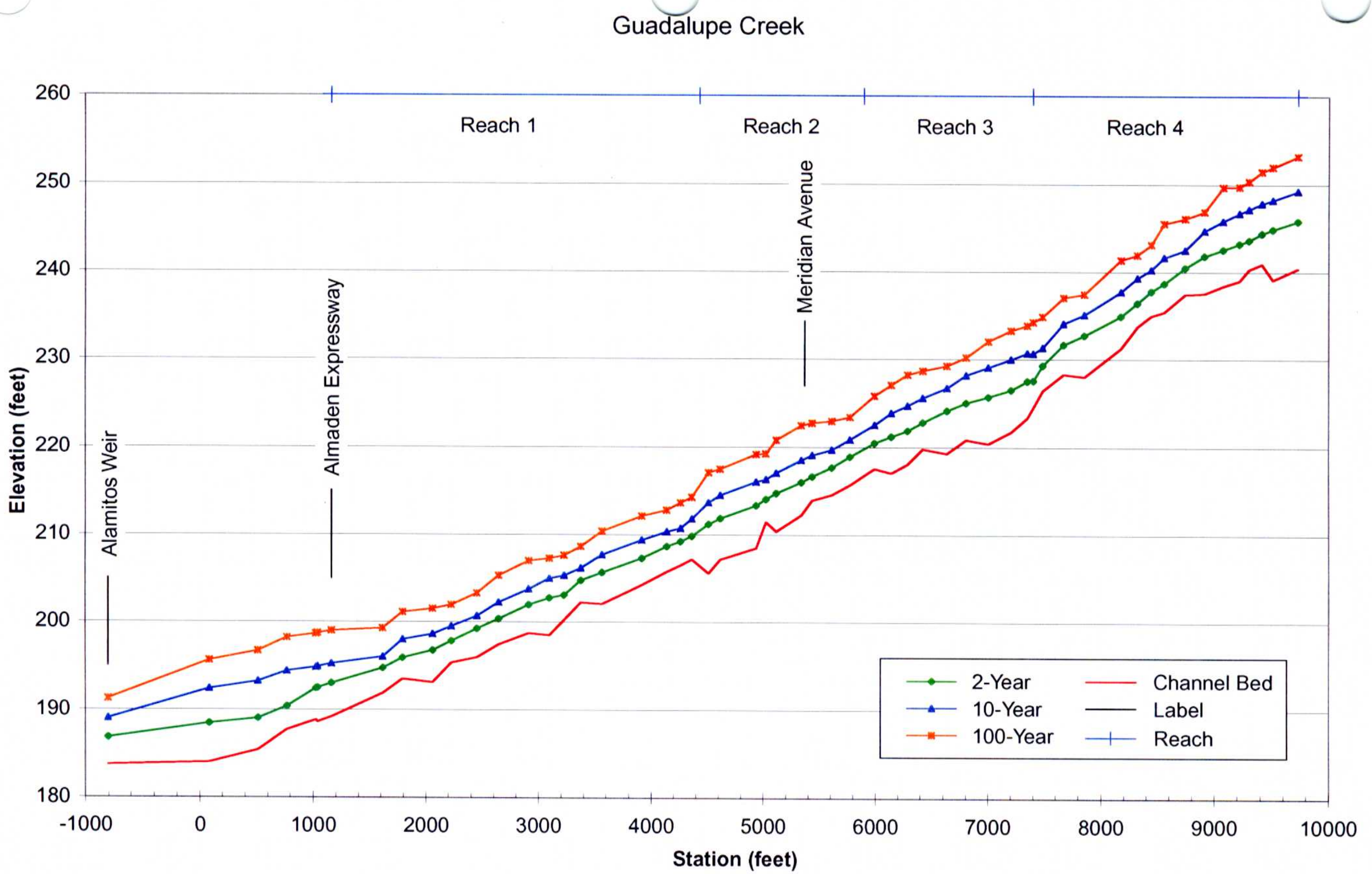


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Figure 3-21
Computed 2-, 10-, and 100-Year Water-Surface Profiles

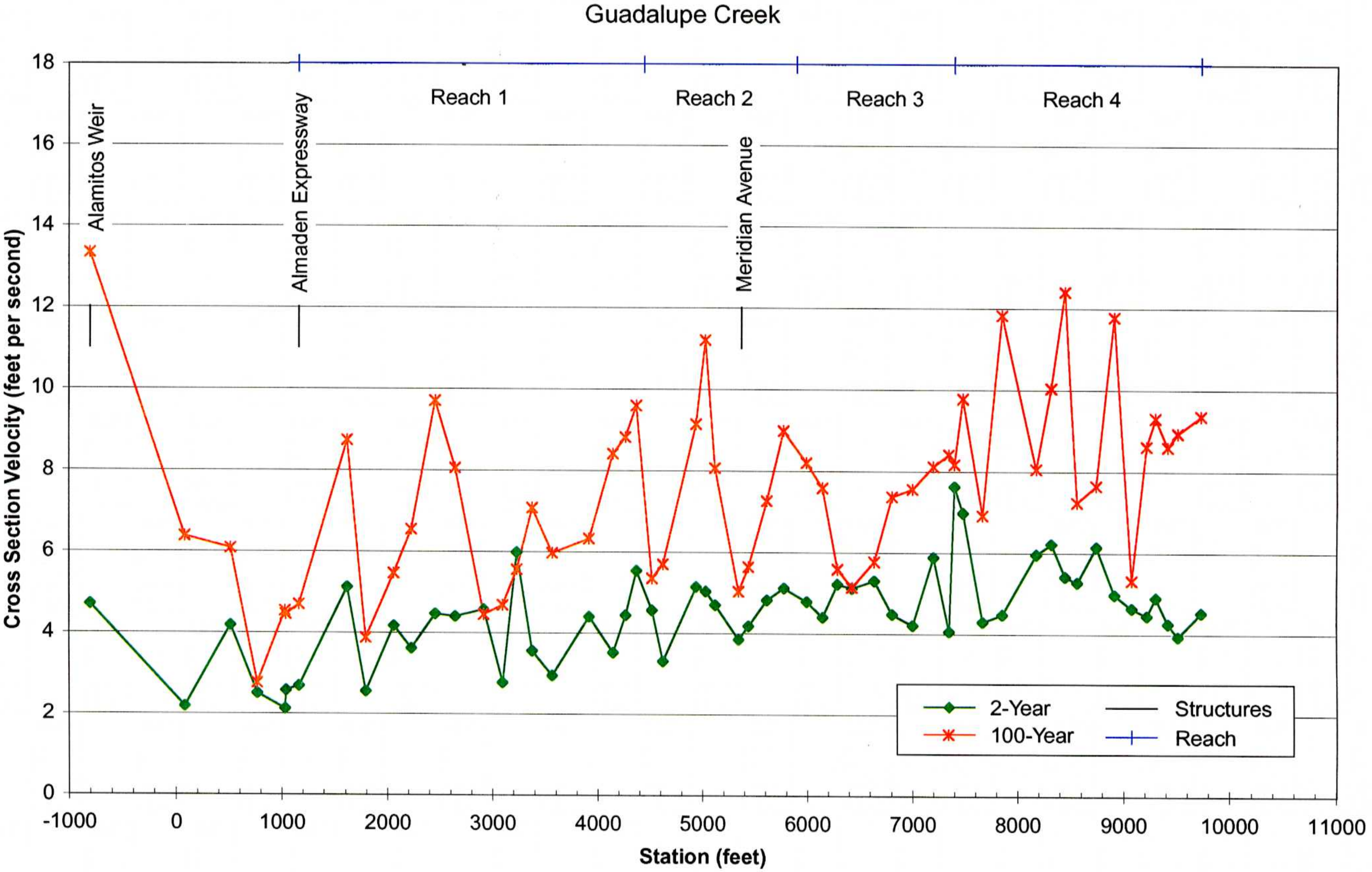

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Figure 3-22
Computed Velocity Profile

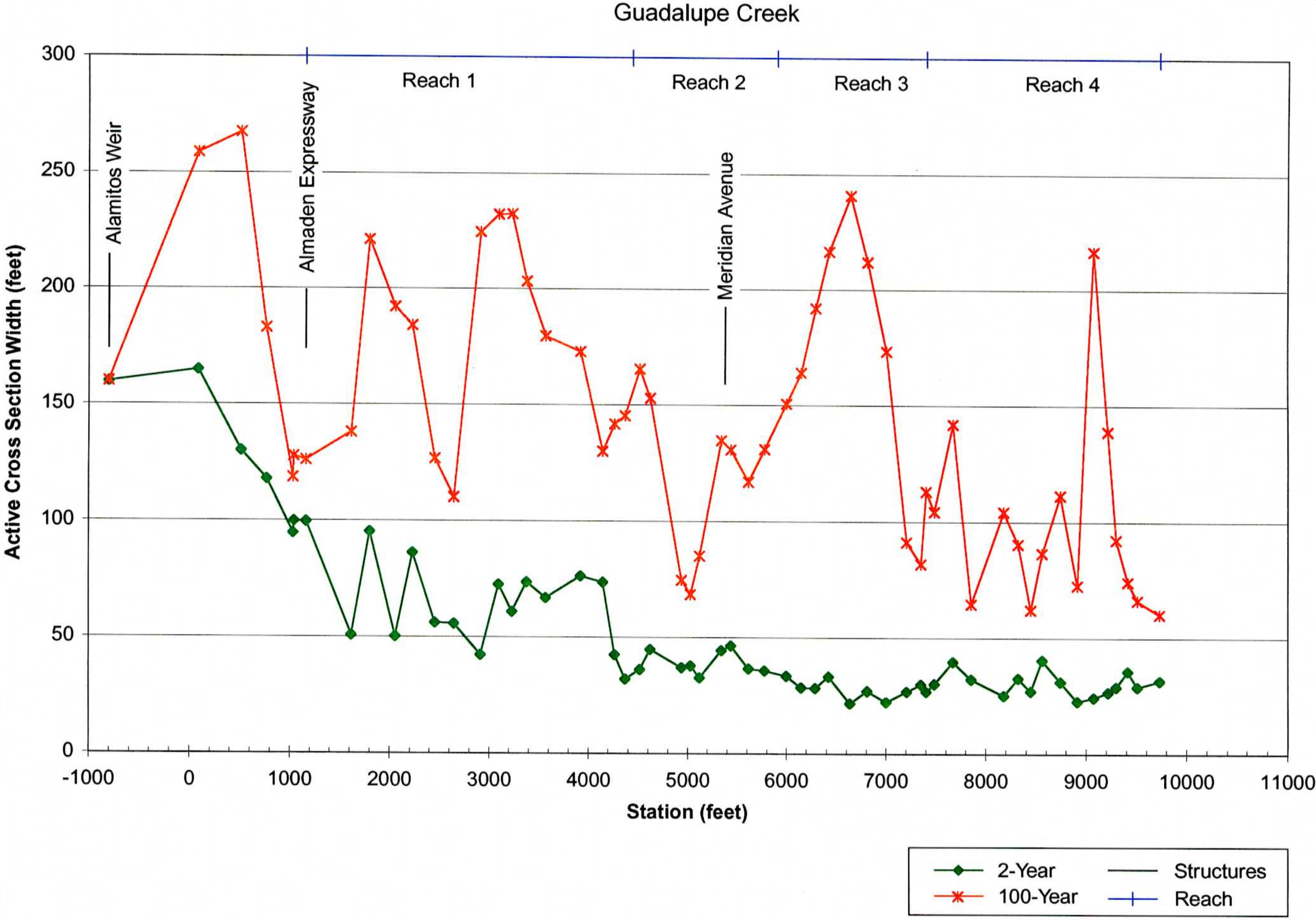

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Figure 3-23
Computed Active Channel Widths

Table 3-6. HEC-RAS Hydraulic Output Summary for Guadalupe Creek

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
100	400	183.7	186.34	186.67	0.001786	5.28	116.56	159.61	0.58	0.71
100	880	183.7	186.79	187.28	0.002588	7.06	187.72	159.61	0.72	0.76
100	3000	183.7	187.96	189.06	0.003710	10.53	375.48	159.64	0.90	0.92
100	5400	183.7	188.99	190.62	0.003773	12.28	539.02	159.66	0.95	0.96
100	9900	183.7	190.60	193.06	0.003578	14.30	795.90	159.69	0.96	0.98
100	12000	183.7	191.25	194.07	0.003516	15.06	900.49	159.70	0.97	0.99
110	400	184.0	187.48	187.53	0.000575	1.79	260.51	145.98	0.21	0.20
110	880	184.0	188.43	188.53	0.000845	2.69	406.39	164.82	0.26	0.24
110	3000	184.0	190.72	191.04	0.001397	4.94	828.97	192.32	0.37	0.31
110	5400	184.0	192.37	192.93	0.001753	6.58	1157.99	205.03	0.43	0.35
110	9900	184.0	194.68	195.64	0.002164	8.80	1653.10	234.44	0.50	0.40
110	12000	184.0	195.59	196.73	0.002285	9.61	1882.58	258.54	0.52	0.42
120	400	185.4	187.93	188.18	0.006606	4.02	99.42	78.74	0.63	0.63
120	880	185.4	188.96	189.28	0.004146	4.58	210.97	129.91	0.55	0.58
120	3000	185.4	191.42	191.91	0.002748	6.17	710.37	218.61	0.51	0.41
120	5400	185.4	193.20	193.87	0.002561	7.40	1106.22	225.38	0.52	0.39
120	9900	185.4	195.68	196.65	0.002547	9.18	1711.42	265.07	0.54	0.40
120	12000	185.4	196.68	197.76	0.002504	9.77	1976.99	267.33	0.55	0.39
140	220	187.7	189.85	189.95	0.007779	2.61	91.87	93.87	0.40	0.43
140	360	187.7	190.35	190.47	0.006292	2.91	144.59	117.64	0.38	0.40
140	825	187.7	192.48	192.56	0.001613	2.47	415.30	133.57	0.22	0.20
140	1250	187.7	194.36	194.43	0.000908	2.40	693.47	175.25	0.18	0.16
140	2900	187.7	197.12	197.24	0.001010	3.28	1183.07	180.21	0.20	0.17
140	3800	187.7	198.20	198.35	0.001092	3.69	1379.80	182.80	0.21	0.18
150	220	188.8	191.97	192.01	0.007949	1.57	132.20	92.78	0.24	0.25
150	360	188.8	192.38	192.45	0.009280	2.02	170.70	94.62	0.27	0.28
150	825	188.8	193.34	193.49	0.012108	3.10	263.15	98.70	0.33	0.34
150	1250	188.8	194.82	194.96	0.006590	3.07	413.23	103.83	0.27	0.27
150	2900	188.8	197.56	197.83	0.006565	4.30	711.18	113.90	0.29	0.29
150	3800	188.8	198.66	198.99	0.006847	4.84	838.88	118.49	0.30	0.30

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1008	220	188.6	192.03	192.11	0.007757	2.41	103.42	72.85	0.31	0.31
1008	360	188.6	192.45	192.57	0.010146	3.15	140.09	99.85	0.37	0.38
1008	825	188.6	193.42	193.63	0.010587	4.09	239.52	104.10	0.40	0.40
1008	1250	188.6	194.86	195.03	0.005193	3.66	393.85	110.79	0.30	0.30
1008	2900	188.6	197.61	197.88	0.004458	4.61	715.05	122.66	0.30	0.30
1008	3800	188.6	198.72	199.05	0.004473	5.07	853.65	127.56	0.31	0.30
1009	Bridge									
1010	220	189.2	192.50	192.59	0.001815	2.68	93.84	69.29	0.35	0.36
1010	360	189.2	192.99	193.13	0.002201	3.28	134.55	99.61	0.39	0.41
1010	825	189.2	194.05	194.24	0.002091	3.95	242.21	104.21	0.39	0.39
1010	1250	189.2	195.24	195.43	0.001325	3.77	369.32	109.64	0.31	0.32
1010	2900	189.2	197.96	198.26	0.001096	4.59	684.29	121.55	0.30	0.31
1010	3800	189.2	198.98	199.34	0.001137	5.08	809.78	126.03	0.31	0.33
1020	220	191.9	194.18	194.61	0.017584	5.34	43.82	49.96	0.88	0.94
1020	360	191.9	194.71	195.13	0.011261	5.41	70.48	50.82	0.74	0.76
1020	825	191.9	195.53	196.38	0.013259	7.66	112.43	51.61	0.86	0.88
1020	1250	191.9	196.02	197.32	0.015938	9.47	137.94	53.12	0.97	0.99
1020	2900	191.9	198.45	199.93	0.008785	10.50	329.91	124.14	0.80	0.95
1020	3800	191.9	199.25	200.77	0.007902	10.93	435.18	137.88	0.77	0.87
1025	220	193.5	195.49	195.57	0.002539	2.52	104.68	93.17	0.35	0.35
1025	360	193.5	195.89	196.00	0.002642	2.94	141.94	95.19	0.37	0.37
1025	825	193.5	197.05	197.21	0.002167	3.59	255.29	100.66	0.36	0.36
1025	1250	193.5	197.94	198.15	0.001884	3.97	348.49	133.17	0.35	0.39
1025	2900	193.5	200.33	200.55	0.001403	4.69	817.16	210.22	0.33	0.32
1025	3800	193.5	201.10	201.36	0.001360	4.99	981.92	221.06	0.33	0.32
1030	220	193.1	196.29	196.46	0.004460	3.46	65.25	42.69	0.44	0.48
1030	360	193.1	196.74	197.01	0.005576	4.33	86.46	50.11	0.50	0.56
1030	825	193.1	197.79	198.23	0.007069	6.10	166.26	89.17	0.59	0.64

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1030	1250	193.1	198.56	199.03	0.005924	6.31	237.27	95.92	0.55	0.59
1030	2900	193.1	200.74	201.19	0.003885	6.51	555.54	185.02	0.46	0.53
1030	3800	193.1	201.49	201.97	0.003633	6.69	696.26	191.97	0.45	0.51
1035	220	195.3	197.26	197.50	0.008996	4.05	57.57	58.33	0.64	0.68
1035	360	195.3	197.82	198.04	0.006898	3.94	99.85	86.17	0.58	0.59
1035	825	195.3	198.87	199.17	0.004643	4.65	194.97	94.10	0.52	0.52
1035	1250	195.3	199.49	199.89	0.004726	5.43	254.33	98.85	0.54	0.54
1035	2900	195.3	201.26	201.95	0.004784	7.37	458.52	175.30	0.59	0.69
1035	3800	195.3	201.93	202.72	0.004821	8.07	580.72	183.88	0.60	0.65
1040	220	195.9	198.71	198.93	0.004695	3.76	58.51	38.87	0.54	0.54
1040	360	195.9	199.19	199.50	0.005912	4.46	80.74	56.11	0.65	0.66
1040	825	195.9	200.04	200.67	0.008825	6.38	130.15	59.58	0.75	0.76
1040	1250	195.9	200.64	201.53	0.010002	7.61	166.33	61.61	0.79	0.81
1040	2900	195.9	202.19	204.14	0.013502	11.30	269.24	85.23	0.95	1.07
1040	3800	195.9	203.31	205.11	0.009805	11.13	392.27	126.60	0.84	0.97
1045	220	197.4	199.74	200.00	0.006555	4.18	54.79	41.15	0.57	0.61
1045	360	197.4	200.30	200.64	0.005941	4.84	81.97	55.63	0.57	0.64
1045	825	197.4	201.47	201.97	0.005334	6.08	152.34	63.14	0.58	0.61
1045	1250	197.4	202.25	202.89	0.005189	6.89	203.47	67.18	0.59	0.62
1045	2900	197.4	204.66	205.59	0.004396	8.60	404.52	101.98	0.59	0.63
1045	3800	197.4	205.30	206.48	0.005152	9.90	472.06	110.15	0.65	0.69
1050	220	198.7	201.40	201.62	0.005559	3.81	57.76	35.13	0.52	0.52
1050	360	198.7	201.95	202.27	0.006304	4.59	78.80	42.23	0.57	0.59
1050	825	198.7	203.02	203.68	0.007280	6.58	132.33	60.06	0.66	0.74
1050	1250	198.7	203.75	204.58	0.007240	7.57	190.38	119.84	0.69	0.92
1050	2900	198.7	206.10	206.48	0.002366	5.97	660.90	219.30	0.43	0.45
1050	3800	198.7	206.98	207.34	0.001900	5.85	855.88	224.36	0.39	0.40
1055	220	198.5	202.10	202.21	0.002081	2.71	87.14	58.78	0.33	0.37
1055	360	198.5	202.75	202.90	0.002096	3.21	130.37	72.64	0.35	0.36

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1055	825	198.5	204.13	204.39	0.002259	4.41	237.90	82.58	0.39	0.36
1055	1250	198.5	204.97	205.34	0.002518	5.29	318.03	137.54	0.42	0.46
1055	2900	198.5	206.47	207.04	0.003373	7.31	625.08	227.75	0.51	0.49
1055	3800	198.5	207.28	207.81	0.002857	7.29	812.01	231.96	0.48	0.44
1057	220	200.2	202.44	203.02	0.023311	6.12	35.94	31.65	1.01	1.01
1057	360	200.2	203.06	203.64	0.016808	6.08	60.30	60.85	0.89	1.06
1057	825	200.2	204.44	204.95	0.006877	6.08	155.09	82.00	0.64	0.68
1057	1250	200.2	205.33	205.86	0.005306	6.42	240.94	120.16	0.59	0.65
1057	2900	200.2	206.92	207.65	0.005458	8.26	517.03	223.35	0.63	0.65
1057	3800	200.2	207.64	208.34	0.004645	8.30	683.64	232.25	0.60	0.57
1060	220	202.2	204.25	204.43	0.004893	3.42	69.13	59.84	0.48	0.52
1060	360	202.2	204.73	204.97	0.005362	4.08	101.64	73.55	0.52	0.53
1060	825	202.2	205.52	206.06	0.007887	6.16	164.01	81.19	0.67	0.62
1060	1250	202.2	206.17	206.88	0.008018	7.19	217.67	84.76	0.70	0.63
1060	2900	202.2	207.48	209.10	0.012385	11.18	335.58	117.97	0.92	0.90
1060	3800	202.2	208.61	209.83	0.007717	10.23	537.56	203.16	0.75	0.77
1065	220	202.1	205.08	205.21	0.003487	3.00	85.00	64.23	0.38	0.40
1065	360	202.1	205.65	205.83	0.003845	3.60	122.39	66.87	0.40	0.38
1065	825	202.1	206.89	207.23	0.004891	5.08	208.79	72.58	0.47	0.41
1065	1250	202.1	207.67	208.17	0.005668	6.12	267.37	76.74	0.51	0.44
1065	2900	202.1	210.00	210.60	0.004947	7.37	567.58	177.24	0.50	0.50
1065	3800	202.1	210.39	211.18	0.006184	8.53	637.11	179.38	0.56	0.56
1070	220	204.3	206.67	206.94	0.006998	4.20	52.35	32.69	0.59	0.59
1070	360	204.3	207.30	207.64	0.006773	4.69	81.91	76.38	0.59	0.75
1070	825	204.3	208.52	208.89	0.004520	5.18	176.57	78.29	0.52	0.55
1070	1250	204.3	209.37	209.80	0.003880	5.57	244.50	81.19	0.49	0.52
1070	2900	204.3	211.43	212.07	0.003574	6.93	489.60	169.50	0.50	0.61
1070	3800	204.3	212.09	212.81	0.003631	7.49	601.58	172.86	0.51	0.60
1075	220	205.8	208.08	208.28	0.005118	3.73	64.91	59.66	0.51	0.57

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1075	360	205.8	208.63	208.84	0.004297	4.02	102.44	73.61	0.48	0.52
1075	825	205.8	209.57	209.94	0.004766	5.19	173.27	76.29	0.53	0.56
1075	1250	205.8	210.30	210.76	0.004598	5.73	229.66	78.45	0.54	0.56
1075	2900	205.8	212.22	213.09	0.004988	7.49	387.44	88.61	0.59	0.63
1075	3800	205.8	212.81	213.96	0.005713	8.63	452.02	129.98	0.65	0.79
1077	220	206.5	208.70	208.90	0.005135	3.56	61.79	39.43	0.50	0.50
1077	360	206.5	209.18	209.48	0.006155	4.43	81.18	42.55	0.57	0.57
1077	825	206.5	210.12	210.80	0.009238	6.62	124.76	49.92	0.73	0.74
1077	1250	206.5	210.71	211.73	0.010583	8.12	156.24	57.10	0.80	0.85
1077	2900	206.5	212.72	214.42	0.009690	10.79	308.15	116.17	0.84	1.02
1077	3800	206.5	213.65	215.26	0.007940	10.90	431.47	141.73	0.78	0.89
1080	220	207.2	209.29	209.61	0.008480	4.55	48.39	30.59	0.64	0.64
1080	360	207.2	209.83	210.30	0.009070	5.53	65.09	31.94	0.68	0.68
1080	825	207.2	211.01	211.93	0.011245	7.73	110.11	53.48	0.80	0.92
1080	1250	207.2	211.76	212.87	0.010743	8.71	162.05	81.39	0.81	0.96
1080	2900	207.2	213.98	215.37	0.008057	10.40	356.50	122.45	0.76	0.84
1080	3800	207.2	214.27	216.43	0.011956	13.09	396.58	145.18	0.93	1.02
1085	220	205.6	210.48	210.70	0.006324	3.78	58.19	25.04	0.44	0.44
1085	360	205.6	211.18	211.52	0.007328	4.69	78.98	36.08	0.48	0.54
1085	825	205.6	212.79	213.38	0.008096	6.39	168.90	83.37	0.53	0.60
1085	1250	205.6	213.63	214.32	0.008492	7.28	245.61	100.05	0.56	0.57
1085	2900	205.6	215.78	216.60	0.007912	8.83	503.93	155.14	0.57	0.56
1085	3800	205.6	217.07	217.66	0.004949	7.77	712.22	165.41	0.46	0.45
1090	220	207.2	211.01	211.16	0.003023	3.04	74.55	37.95	0.32	0.37
1090	360	207.2	211.83	212.04	0.003400	3.76	109.23	44.71	0.35	0.37
1090	825	207.2	213.60	213.99	0.004259	5.30	229.93	84.29	0.41	0.38
1090	1250	207.2	214.47	215.03	0.005408	6.49	304.51	87.35	0.47	0.39
1090	2900	207.2	216.47	217.54	0.008664	9.57	523.04	141.75	0.60	0.51
1090	3800	207.2	217.44	218.41	0.007773	9.61	667.84	152.76	0.58	0.48

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1100	220	208.5	212.32	212.73	0.008310	5.16	42.62	20.61	0.63	0.63
1100	360	208.5	213.28	213.70	0.008119	5.18	70.02	36.97	0.64	0.66
1100	825	208.5	214.99	215.49	0.005027	5.81	149.69	53.97	0.55	0.58
1100	1250	208.5	215.98	216.59	0.004480	6.49	205.88	58.86	0.54	0.57
1100	2900	208.5	218.40	219.47	0.004595	8.77	362.65	70.87	0.59	0.62
1100	3800	208.5	219.14	220.53	0.005305	10.08	416.06	74.62	0.64	0.68
1105	220	211.4	213.27	213.65	0.013580	4.96	44.40	35.37	0.78	0.78
1105	360	211.4	214.02	214.41	0.008151	5.02	71.75	37.66	0.64	0.64
1105	825	211.4	215.41	216.07	0.007579	6.49	127.13	41.92	0.66	0.66
1105	1250	211.4	216.29	217.18	0.007698	7.58	166.11	47.95	0.68	0.71
1105	2900	211.4	218.51	220.18	0.008276	10.58	292.87	64.50	0.76	0.82
1105	3800	211.4	219.21	221.37	0.009422	12.14	339.27	68.46	0.82	0.89
1110	220	210.4	214.07	214.29	0.004040	3.76	58.56	27.73	0.46	0.46
1110	360	210.4	214.68	215.02	0.005395	4.69	76.83	32.49	0.54	0.54
1110	825	210.4	216.06	216.70	0.006256	6.46	133.72	54.44	0.62	0.69
1110	1250	210.4	217.00	217.80	0.005849	7.35	190.16	64.44	0.62	0.67
1110	2900	210.4	219.67	220.80	0.004807	9.16	381.86	79.22	0.61	0.61
1110	3800	210.4	220.76	222.05	0.004620	9.88	471.58	85.09	0.61	0.60
1114	220	212.2	215.17	215.41	0.006320	4.14	61.39	40.65	0.55	0.51
1114	360	212.2	215.93	216.20	0.005061	4.47	93.69	44.42	0.52	0.47
1114	825	212.2	217.49	217.85	0.003809	5.37	198.90	87.48	0.49	0.48
1114	1250	212.2	218.47	218.86	0.003147	5.70	291.23	99.92	0.46	0.44
1114	2900	212.2	221.23	221.69	0.002145	6.39	603.45	124.58	0.41	0.38
1114	3800	212.2	222.42	222.92	0.001933	6.69	757.66	134.69	0.40	0.37
1115	Bridge									
1116	220	213.9	215.96	216.18	0.006582	3.77	58.38	40.55	0.55	0.55
1116	360	213.9	216.61	216.88	0.005333	4.19	86.33	46.35	0.52	0.54
1116	825	213.9	218.10	218.49	0.004293	5.09	171.35	71.74	0.50	0.55
1116	1250	213.9	219.00	219.44	0.003730	5.55	251.45	97.61	0.49	0.55

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1116	2900	213.9	221.55	222.07	0.002449	6.25	530.08	120.04	0.43	0.46
1116	3800	213.9	222.71	223.25	0.002124	6.48	674.84	130.79	0.41	0.44
1120	220	214.5	217.11	217.35	0.006497	3.94	55.86	34.92	0.55	0.55
1120	360	214.5	217.63	217.99	0.007107	4.82	74.68	36.49	0.59	0.59
1120	825	214.5	218.88	219.51	0.006915	6.49	136.84	62.70	0.63	0.72
1120	1250	214.5	219.63	220.42	0.007000	7.48	189.69	80.45	0.66	0.76
1120	2900	214.5	221.86	222.77	0.004948	8.44	402.27	106.13	0.59	0.65
1120	3800	214.5	222.95	223.85	0.004055	8.50	523.49	116.87	0.55	0.60
1125	220	215.6	218.20	218.50	0.007644	4.41	49.91	30.14	0.60	0.60
1125	360	215.6	218.83	219.23	0.008184	5.11	70.42	35.61	0.64	0.64
1125	825	215.6	220.06	220.77	0.008464	6.83	127.41	61.04	0.69	0.79
1125	1250	215.6	220.80	221.66	0.008219	7.73	178.72	74.41	0.70	0.80
1125	2900	215.6	222.56	223.96	0.008730	10.29	325.73	97.22	0.77	0.86
1125	3800	215.6	223.42	224.95	0.008357	11.08	423.56	130.86	0.77	0.88
1140	220	217.5	219.75	220.01	0.006155	4.07	54.01	31.63	0.55	0.55
1140	360	217.5	220.40	220.76	0.005988	4.78	75.28	33.32	0.56	0.56
1140	825	217.5	221.76	222.46	0.007093	6.70	123.80	39.97	0.64	0.67
1140	1250	217.5	222.48	223.53	0.008384	8.28	154.65	46.08	0.72	0.78
1140	2900	217.5	225.07	226.51	0.006701	10.27	353.48	135.61	0.70	0.90
1140	3800	217.5	225.83	227.30	0.006379	10.77	463.40	150.57	0.70	0.82
1145	220	217.0	220.44	220.63	0.003014	3.53	62.32	25.00	0.39	0.39
1145	360	217.0	221.17	221.47	0.003868	4.40	81.89	28.49	0.46	0.46
1145	825	217.0	222.80	223.38	0.005350	6.13	134.58	36.25	0.56	0.56
1145	1250	217.0	223.82	224.62	0.006113	7.19	173.99	41.79	0.61	0.62
1145	2900	217.0	226.34	227.44	0.005472	8.95	393.58	147.53	0.62	0.79
1145	3800	217.0	227.03	228.21	0.005449	9.56	501.36	163.91	0.63	0.76
1150	220	218.0	220.99	221.33	0.007479	4.65	47.29	25.22	0.60	0.60
1150	360	218.0	221.81	222.23	0.006706	5.21	69.15	28.25	0.59	0.59
1150	825	218.0	223.60	224.27	0.006598	6.57	125.51	35.46	0.61	0.62

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1150	1250	218.0	224.70	225.49	0.005862	7.27	182.52	56.06	0.59	0.67
1150	2900	218.0	227.48	228.07	0.003041	7.15	541.51	186.74	0.46	0.55
1150	3800	218.0	228.22	228.82	0.002856	7.38	681.60	191.81	0.45	0.52
1155	220	219.7	222.08	222.41	0.008475	4.55	48.31	30.10	0.63	0.63
1155	360	219.7	222.78	223.19	0.007462	5.11	70.46	33.17	0.62	0.62
1155	825	219.7	224.55	225.12	0.005957	6.06	136.03	40.92	0.59	0.59
1155	1250	219.7	225.56	226.26	0.005379	6.81	199.20	90.83	0.58	0.75
1155	2900	219.7	227.97	228.48	0.002858	6.69	585.63	211.21	0.46	0.52
1155	3800	219.7	228.69	229.20	0.002593	6.82	739.14	216.20	0.44	0.49
1160	220	219.3	223.36	223.64	0.004113	4.20	52.34	18.75	0.44	0.44
1160	360	219.3	224.14	224.58	0.005563	5.30	67.92	21.61	0.53	0.53
1160	825	219.3	225.79	226.67	0.007707	7.55	113.40	51.63	0.65	0.87
1160	1250	219.3	226.70	227.68	0.007322	8.40	182.60	88.62	0.66	0.84
1160	2900	219.3	228.55	229.47	0.006128	9.48	490.27	230.17	0.64	0.71
1160	3800	219.3	229.26	230.03	0.004945	9.09	658.49	240.52	0.58	0.61
1165	220	220.8	224.11	224.35	0.004278	3.94	55.78	25.31	0.47	0.47
1165	360	220.8	225.05	225.36	0.003815	4.47	80.48	27.07	0.46	0.46
1165	825	220.8	227.18	227.68	0.004425	5.69	144.93	37.49	0.51	0.51
1165	1250	220.8	228.18	228.85	0.006129	6.57	190.83	53.78	0.61	0.61
1165	2900	220.8	229.78	230.73	0.006860	8.51	429.86	209.40	0.68	0.83
1165	3800	220.8	230.18	231.28	0.007495	9.38	515.41	211.66	0.72	0.83
1170	220	220.4	224.76	224.94	0.002163	3.37	65.34	20.12	0.33	0.33
1170	360	220.4	225.72	225.99	0.002729	4.20	85.64	22.22	0.38	0.38
1170	825	220.4	227.91	228.44	0.003364	5.86	146.55	37.80	0.44	0.50
1170	1250	220.4	229.07	229.78	0.003697	6.98	199.51	53.71	0.48	0.57
1170	2900	220.4	230.56	232.47	0.008150	11.86	290.90	68.01	0.73	0.85
1170	3800	220.4	232.05	233.39	0.005385	10.77	503.50	173.18	0.61	0.78
1175	220	221.7	225.38	225.96	0.013691	6.11	35.99	19.22	0.79	0.79
1175	360	221.7	226.48	227.01	0.009580	5.88	61.27	26.80	0.68	0.68

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1175	825	221.7	228.77	229.31	0.005666	5.94	139.00	40.41	0.56	0.56
1175	1250	221.7	229.98	230.65	0.004936	6.55	192.98	48.66	0.55	0.57
1175	2900	221.7	232.81	233.65	0.003724	7.84	427.35	126.97	0.51	0.55
1175	3800	221.7	233.26	234.45	0.004916	9.38	468.71	155.66	0.60	0.63
1180	220	223.3	226.61	226.79	0.002913	3.46	63.76	26.97	0.39	0.40
1180	360	223.3	227.49	227.75	0.002923	4.09	88.89	29.94	0.41	0.41
1180	825	223.3	229.52	229.94	0.003258	5.24	161.46	41.70	0.46	0.46
1180	1250	223.3	230.68	231.24	0.003270	6.08	216.54	66.95	0.47	0.57
1180	2900	223.3	233.25	234.23	0.003638	8.42	404.26	79.07	0.54	0.56
1180	3800	223.3	233.84	235.20	0.004634	9.98	451.99	81.87	0.61	0.63
1183	220	224.5	226.95	227.66	0.022105	6.77	32.49	23.23	1.01	1.01
1183	360	224.5	227.53	228.44	0.020664	7.62	47.25	26.81	1.01	1.01
1183	825	224.5	229.49	230.35	0.010229	7.43	110.99	38.24	0.77	0.77
1183	1250	224.5	230.66	231.61	0.008084	7.85	162.12	53.10	0.71	0.78
1183	2900	224.5	233.41	234.48	0.005006	8.84	379.92	100.58	0.61	0.69
1183	3800	224.5	234.23	235.47	0.005127	9.69	465.50	113.07	0.63	0.71
1185	220	226.4	228.72	229.29	0.017825	6.10	36.07	25.60	0.91	0.91
1185	360	226.4	229.27	230.03	0.018002	6.97	51.65	30.16	0.94	0.94
1185	825	226.4	230.45	231.73	0.018121	9.07	90.95	35.52	1.00	1.00
1185	1250	226.4	231.33	232.92	0.017013	10.13	123.35	38.59	1.00	1.00
1185	2900	226.4	234.15	235.74	0.009034	10.65	316.32	100.12	0.80	0.91
1185	3800	226.4	234.86	236.66	0.009060	11.56	388.98	104.43	0.81	0.89
1190	220	228.3	231.04	231.24	0.006749	3.63	60.64	38.12	0.51	0.51
1190	360	228.3	231.64	231.93	0.006378	4.29	84.14	39.57	0.52	0.52
1190	825	228.3	233.09	233.59	0.005980	5.75	150.15	65.89	0.54	0.64
1190	1250	228.3	234.05	234.61	0.005174	6.28	233.50	97.98	0.52	0.61
1190	2900	228.3	236.23	236.97	0.004567	7.68	458.83	107.65	0.52	0.54
1190	3800	228.3	237.03	237.92	0.004809	8.50	549.71	141.93	0.55	0.62
1200	220	228.0	232.04	232.25	0.004645	3.67	59.96	27.19	0.44	0.44

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1200	360	228.0	232.74	233.05	0.005923	4.47	80.51	32.07	0.50	0.50
1200	825	228.0	234.27	234.83	0.007610	5.99	137.84	41.27	0.58	0.58
1200	1250	228.0	235.09	235.89	0.009103	7.21	176.08	54.94	0.64	0.70
1200	2900	228.0	236.80	238.59	0.014011	10.98	280.92	63.21	0.83	0.86
1200	3800	228.0	237.44	239.79	0.016386	12.64	321.38	64.46	0.90	0.93
1210	220	231.3	234.07	234.53	0.010800	5.43	40.53	23.05	0.72	0.72
1210	360	231.3	234.89	235.44	0.008801	5.95	60.46	25.25	0.68	0.68
1210	825	231.3	236.64	237.54	0.008498	7.61	108.35	29.65	0.70	0.70
1210	1250	231.3	237.74	238.92	0.008848	8.72	146.08	46.76	0.73	0.85
1210	2900	231.3	240.28	241.48	0.006058	9.62	360.90	98.85	0.65	0.74
1210	3800	231.3	241.37	242.52	0.004920	9.58	471.90	104.39	0.60	0.67
1215	220	233.7	235.87	236.32	0.014652	5.37	41.00	30.96	0.82	0.82
1215	360	233.7	236.41	237.00	0.013415	6.21	58.02	32.67	0.82	0.82
1215	825	233.7	238.01	238.81	0.009152	7.21	114.35	37.70	0.73	0.73
1215	1250	233.7	239.27	240.16	0.007972	7.56	165.42	45.62	0.70	0.70
1215	2900	233.7	241.13	242.63	0.009206	10.18	309.83	87.06	0.80	0.87
1215	3800	233.7	241.91	243.62	0.008870	10.99	378.82	90.57	0.80	0.86
1220	220	234.9	237.17	237.46	0.006124	4.32	50.93	26.14	0.55	0.55
1220	360	234.9	237.76	238.22	0.007209	5.41	66.56	26.99	0.61	0.61
1220	825	234.9	239.09	240.07	0.010106	7.94	103.86	29.60	0.75	0.75
1220	1250	234.9	240.25	241.43	0.011409	8.71	145.11	51.26	0.81	0.90
1220	2900	234.9	242.23	244.36	0.013200	12.00	253.29	58.29	0.92	0.97
1220	3800	234.9	243.12	245.61	0.012975	13.04	306.49	84.83	0.93	0.98
1225	220	235.4	237.89	238.25	0.007483	4.84	45.48	23.50	0.61	0.61
1225	360	235.4	238.68	239.12	0.008736	5.34	68.41	40.50	0.67	0.71
1225	825	235.4	240.40	240.86	0.004564	5.65	155.40	55.47	0.53	0.56
1225	1250	235.4	241.64	242.14	0.003365	5.95	231.07	66.39	0.48	0.51
1225	2900	235.4	244.36	245.12	0.002957	7.54	431.29	303.08	0.49	0.51
1225	3800	235.4	245.50	246.37	0.002879	8.17	525.94	535.61	0.49	0.52

Table 3-6. Continued

River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1230	220	237.4	239.74	240.26	0.016713	5.82	37.81	27.77	0.88	0.88
1230	360	237.4	240.45	241.03	0.012156	6.13	58.68	31.15	0.79	0.79
1230	825	237.4	241.41	242.69	0.017960	9.07	90.97	35.75	1.00	1.00
1230	1250	237.4	242.48	243.73	0.014356	9.07	143.13	58.61	0.92	0.98
1230	2900	237.4	244.92	245.97	0.006372	8.94	371.83	104.80	0.68	0.73
1230	3800	237.4	246.08	247.07	0.004680	8.72	497.64	683.23	0.60	0.64
1235	220	237.5	241.12	241.36	0.003292	3.85	57.13	21.01	0.41	0.41
1235	360	237.5	241.83	242.22	0.004467	4.96	72.65	22.74	0.49	0.49
1235	825	237.5	243.91	244.48	0.006636	6.09	136.03	50.31	0.61	0.65
1235	1250	237.5	244.70	245.48	0.007503	7.14	179.97	59.22	0.67	0.70
1235	2900	237.5	245.96	248.01	0.013549	11.73	259.19	161.69	0.94	1.00
1235	3800	237.5	246.88	249.17	0.012206	12.51	323.20	568.24	0.92	0.98
1240	220	238.4	241.66	241.89	0.003347	3.84	57.23	21.70	0.42	0.42
1240	360	238.4	242.55	242.89	0.003817	4.63	77.70	24.31	0.46	0.46
1240	825	238.4	244.82	245.35	0.004312	5.84	141.20	34.13	0.51	0.51
1240	1250	238.4	245.78	246.55	0.005883	7.01	178.21	42.06	0.60	0.60
1240	2900	238.4	248.61	249.27	0.004233	7.11	500.88	456.41	0.55	0.64
1240	3800	238.4	249.65	250.17	0.002777	6.48	715.73	554.16	0.46	0.51
1245	220	239.0	242.24	242.47	0.004758	3.86	56.95	23.96	0.44	0.44
1245	360	239.0	243.19	243.50	0.004608	4.44	81.05	26.62	0.45	0.45
1245	825	239.0	245.50	245.98	0.004291	5.51	149.85	33.09	0.46	0.46
1245	1250	239.0	246.69	247.35	0.005022	6.51	192.04	38.20	0.51	0.51
1245	2900	239.0	249.06	250.29	0.008615	9.07	348.80	363.18	0.70	0.92
1245	3800	239.0	249.73	251.07	0.008617	9.72	441.87	383.49	0.71	0.85
1250	220	240.3	242.69	243.00	0.008293	4.50	48.87	25.47	0.57	0.57
1250	360	240.3	243.60	243.98	0.006742	4.89	73.68	28.78	0.54	0.54
1250	825	240.3	245.88	246.36	0.004895	5.56	148.35	36.81	0.49	0.49
1250	1250	240.3	247.15	247.77	0.005047	6.32	197.90	41.18	0.51	0.51
1250	2900	240.3	249.85	250.93	0.006649	8.48	362.71	292.90	0.61	0.71
1250	3800	240.3	250.35	251.81	0.008368	9.95	408.41	305.55	0.69	0.78

Table 3-6. Continued

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River Station	Flow Total (cubic feet per second)	Minimum Channel Elevation (feet)	Water Surface Elevation (feet)	Total Energy Elevation (feet)	Energy Slope (feet per feet)	Channel Velocity (feet per second)	Flow Area (square feet)	Top Width (feet)	Channel Froude Number	Cross Section Froude Number
1255	220	240.9	243.64	243.86	0.006543	3.78	58.19	33.68	0.51	0.51
1255	360	240.9	244.40	244.68	0.005493	4.25	84.71	35.57	0.49	0.49
1255	825	240.9	246.48	246.88	0.004012	5.02	164.18	41.13	0.44	0.44
1255	1250	240.9	247.81	248.30	0.004088	5.60	223.06	48.04	0.46	0.46
1255	2900	240.9	250.75	251.61	0.004989	7.45	389.41	136.51	0.54	0.54
1255	3800	240.9	251.49	252.65	0.006001	8.65	442.23	185.97	0.60	0.62
1260	220	239.1	244.10	244.25	0.002757	3.11	70.80	27.08	0.34	0.34
1260	360	239.1	244.85	245.09	0.003425	3.92	91.88	28.84	0.39	0.39
1260	825	239.1	246.85	247.29	0.004376	5.30	155.63	36.95	0.46	0.46
1260	1250	239.1	248.20	248.74	0.004848	5.91	211.50	46.51	0.49	0.49
1260	2900	239.1	251.15	252.12	0.004977	7.91	373.03	128.63	0.53	0.57
1260	3800	239.1	251.96	253.24	0.005760	9.16	426.01	163.03	0.58	0.62
1270	220	240.4	244.95	245.20	0.007105	4.05	54.35	28.92	0.52	0.52
1270	360	240.4	245.78	246.10	0.006059	4.52	79.58	31.47	0.50	0.50
1270	825	240.4	247.85	248.32	0.004908	5.49	150.32	37.03	0.48	0.48
1270	1250	240.4	249.23	249.81	0.004784	6.12	204.41	41.70	0.49	0.49
1270	2900	240.4	252.25	253.32	0.005700	8.30	351.40	55.63	0.56	0.58
1270	3800	240.4	253.21	254.59	0.006232	9.47	406.73	82.88	0.60	0.63

Table 3-7. Reach-Averaged Hydraulic Characteristics for Guadalupe Creek

Reach	Event Frequency (years)	Flow (cubic feet per second)	Channel Velocity (feet per second)	Width (feet)	Depth (feet)	Energy Slope (feet per feet)
1	1.5	220	3.8	34	1.6	0.00526
	2	360	4.3	38	2.0	0.00533
	5	825	5.6	39	3.0	0.00550
	10	1250	6.4	39	3.8	0.00536
	50	2900	7.8	39	5.8	0.00526
	100	3600	8.3	39	6.6	0.00522
2	1.5	220	4.3	27	1.9	0.00620
	2	360	4.8	32	2.3	0.00613
	5	825	6.1	35	3.7	0.00587
	10	1250	6.9	35	4.5	0.00583
	50	2900	8.7	35	6.8	0.00585
	100	3600	9.2	35	7.8	0.00579
3	1.5	220	4.3	24	2.2	0.00543
	2	360	4.9	27	2.8	0.00545
	5	825	6.3	35	3.9	0.00560
	10	1250	7.2	37	4.7	0.00573
	50	2900	9.0	38	6.9	0.00565
	100	3600	9.4	38	7.6	0.00579
4	1.5	220	4.4	27	1.9	0.00709
	2	360	5.1	30	2.5	0.00716
	5	825	6.5	36	3.6	0.00739
	10	1250	7.3	41	4.2	0.00752
	50	2900	9.2	47	6.0	0.00783
	100	3600	9.9	48	6.8	0.00799

Comparison with Previous Studies. The computed 100-year water-surface profile was compared to the water-surface profiles calculated for the Corps 1973 flood study and the District 1988 HEC-2 model. The District model was developed for maintenance purposes. Figure 3-24 shows a comparison of the three water-surface profiles. The computed water surfaces are fairly similar, within 2 feet, for the majority of the Project area. The NHC profile is 3–4 feet higher than both the Corps and the District water-surface profiles near Almaden Bridge. These differences may be a result of bar formation upstream from Almaden Bridge and the presence of a dense willow stand downstream from the bridge. The Corps water-surface profile is approximately 5–6 feet lower than both the NHC and the District profiles at station 93+20. The Corps bed profile at this location was shown to be 3 feet lower than the 1999 surveyed profile and is not consistent with the 1972 District channel plans for Guadalupe Creek (Santa Clara Valley Water District 1972). Supporting cross-section data and hydraulic analysis are not available for this profile.

3.1.3.5 Reach-Averaged Sediment Transport Capacities

Introduction. Channel morphology adjusts to changes in hydrology, upstream sediment supply, vegetation, sediment size, bed composition, channel geometry, and slope. The relationship between the sediment supplied to the reach and the sediment transport capacity out of the reach is often a critical factor in the rate and degree of channel change.

Sediment is transported in the creek by the flow of water. The term load is used to refer to the rate of sediment in motion in the stream. Bedload is the portion of the load that moves on or near the bed by rolling, saltation, or sliding (Chang 1992). The sediment transport capacity for bedload was calculated for each reach and compared with other reaches in the Project area to evaluate the stability of the streambed. The bedload transport can be estimated from the channel and streamflow characteristics, which include particle sizes within the bed, width of the moveable bed, flow depth, channel velocity, and energy slope. In general, the flow depth, channel velocity, and energy slope increase with increasing discharge.

Sediment Sources. Sediment is supplied to the creek though mass wasting and erosion processes within the basin. Steep slopes and the highly erodible composition of the Franciscan Complex geologic unit in the drainage basin above Camden Avenue serve as the primary supply of sediment to the creek.

Guadalupe Reservoir has an impact on the sediment supply to Guadalupe Creek. Sediment produced in the area tributary to Guadalupe Reservoir is trapped behind Guadalupe Dam, reducing the sediment producing area of the Guadalupe drainage basin by approximately half. Likewise, flows are significantly reduced as a result of the storage capacity within the reservoir. The net effect of the reservoir on the basin is to reduce the sediment transport potential and sediment supply when there is storage capacity in the reservoir. When the reservoir is full and flows overtop the spillway, the sediment transport potential will increase but the sediment supply remains reduced downstream from the reservoir.

Sediment Characteristics. Wolman pebble counts (Wolman 1954) were collected from bar surfaces at six locations along the Project area. These counts were taken from the most prominent depositional features in the Project area, the alternating gravel bars located in Reach 1. The approximate locations of the samples are shown on the site maps in Appendix B. Figure 3-25 shows a plot of particle sizes at the sampled sites. Smaller scale depositional features with weakly cemented cobble gravel surfaces were found in Reaches 2, 3, and 4. These features may only become active during large events. Visual field inspection found the bed material to range from fine gravel to very coarse gravel in Reach 1 to an armor layer consisting of large gravel and cobble in Reach 4. Pebble count 4 at station 25+60 was used for Reaches 1–4 as a representative bedload gradation for sediment transport capacity computations.

Field Observations. Channel conditions were mapped in the site inventory work conducted in November, 1999, and are described in Section 3.1. In general, the planform of the channel appears to be relatively stable with few areas of significant channel migration. Sinuosity of the channel is low, with few well-developed meanders in the Project area. Several areas of bank erosion

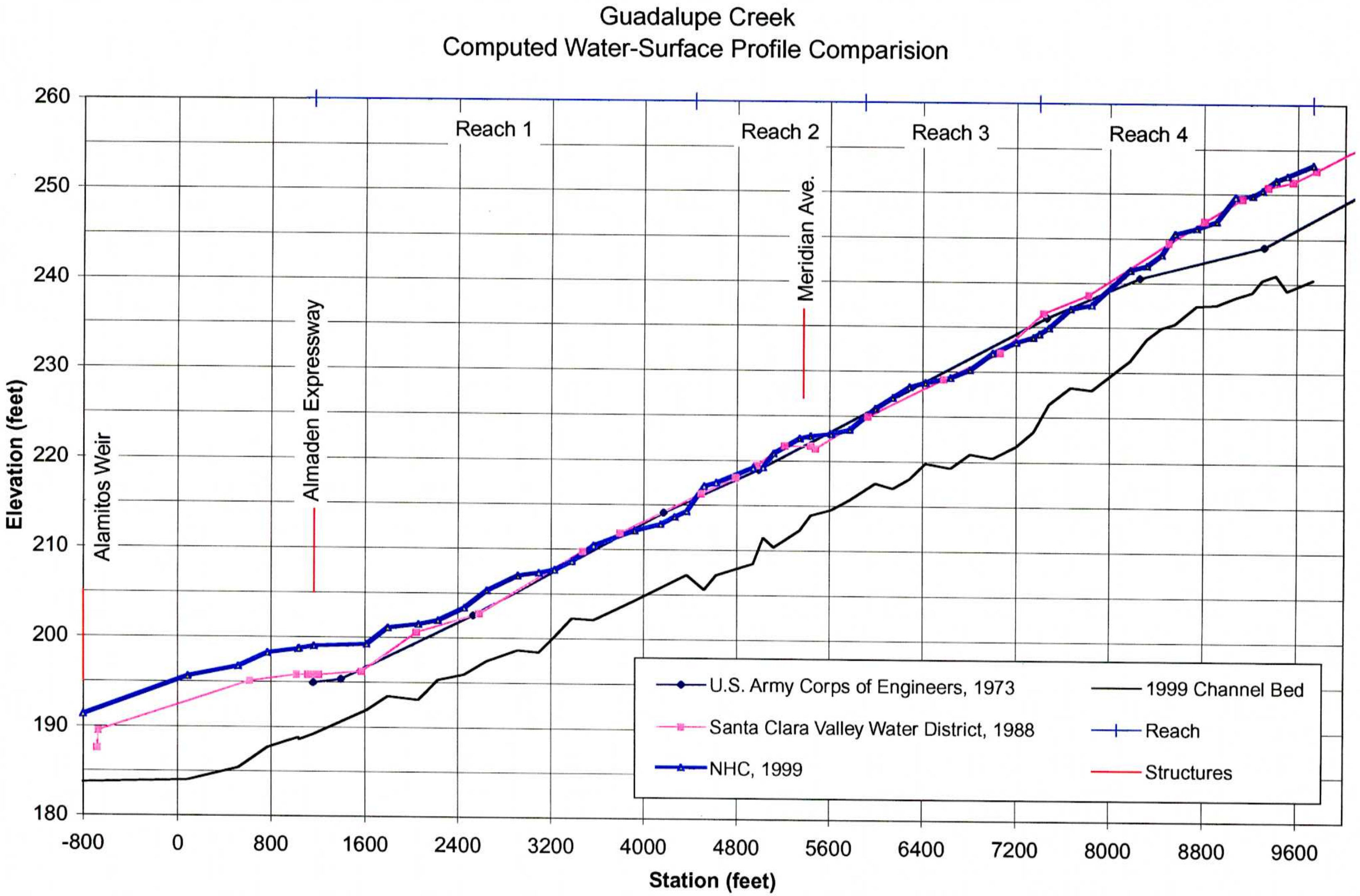

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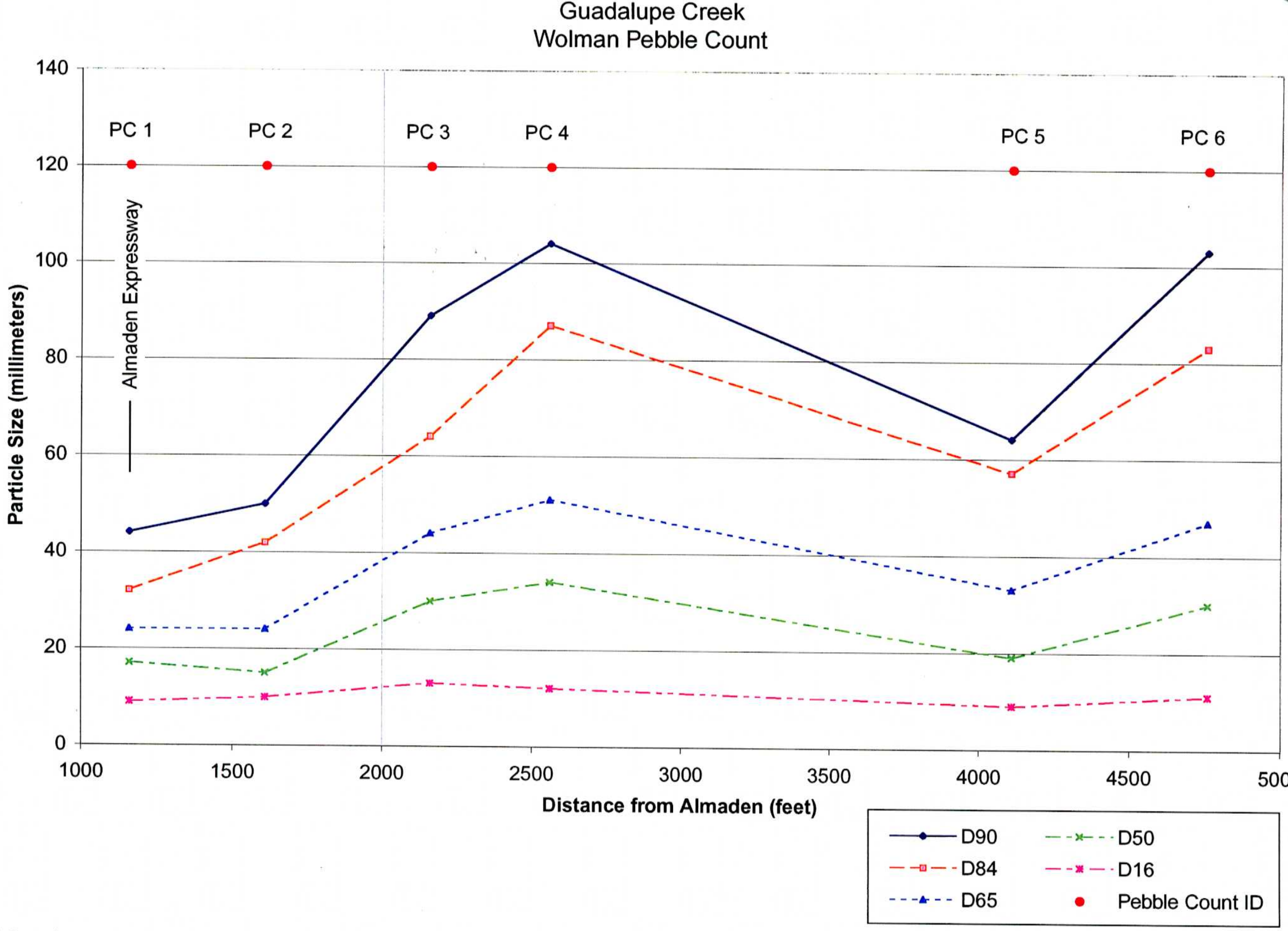
Figure 3-24
Computed 100-Year Water-Surface Profile Comparison



NOTE: D*x* is the particle size (diameter in millimeters) that is equal to or greater than *x* percent of the particles.

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Figure 3-25
Pebble Count Particle Sizes

are present, including some that threaten adjacent infrastructure, and in many areas the lower bank is steep or nearly vertical. However, bank erosion rates appear to be low due to resistant bank materials and the presence of vegetation on the upper bank.

The bed profile comparison described in Section 3.1 indicates channel incision has occurred relatively recently in Reaches 2 through 4. This comparison matches field observations that existing drainage outlet structures and concrete slope protection are undercut 2-4 feet. Unfortunately, dates of construction and original bed elevations at these structures are not presently available. However, the current form of the channel, including the low amount of fine-grained channel deposits and large bed material sizes indicate that the channel still has potential to degrade, especially in Reach 4.

The area immediately upstream from Almaden Expressway has large alternate bars, and the appearance of an aggradational trend. However, the profile comparison indicates relative stability for Reach 1 for the period from 1972 to 1999. Hydraulics at the bridge opening are affected by the structure and by vegetation immediately downstream from the bridge. In addition, this area is subject to backwater during periods of high flow in Alamitos Creek and Guadalupe River. Additional analysis of the bridge opening and the area immediately upstream will be completed in final design to design Project features and identify maintenance requirements to maintain adequate hydraulic capacity through the bridge opening.

Sediment Continuity. The relative differences between sediment transport capacities of reaches can be used to evaluate channel trends and stability. This technique, referred to as sediment continuity routing, identifies changes or breaks in sediment transport between reaches that could lead to aggradational or degradational trends. The sediment continuity between reaches for Guadalupe Creek was estimated by calculating a mass balance of sediment into and out of each reach. The difference between the sediment transport capacity of a reach and that of the reach upstream is used as an indicator to determine if the reach has the potential to aggrade or degrade.

Sediment transport capacities are calculated by multiplying the sediment transport potential for a given grain size by the percent of that size class in the bed. The Hydraulic Design Package for Channels (SAM) (Waterways Experiments Station 1998) was used to compute the transport capacities. This method of assessing sediment transport potential provides a qualitative approach to reviewing the sediment continuity for the Project. However, computed capacities should not be interpreted as actual transport rates, as the method does not explicitly include sediment supply, bed change during an event, bed sorting and armoring, or existence of bed control.

Selection of Transport Function. A bedload function was selected to estimate transport rates for each reach within the Project area. Measured bedload data and suspended load data from which bedload rates might be estimated were not available for Guadalupe Creek. Three bedload equations that were developed for gravel bed rivers were initially applied to the reaches: Einstein bed-load function (1950), Meyer-Peter-Muller (MPM) function (1948), and Profitt-Sutherland (1983). The MPM function was found to compute loads that fell between the Einstein and Proffitt-Sutherland functions. Based on these results, the MPM function was used to compute transport capacities of Guadalupe Creek for a range of discharges. The use of the MPM function for the bedload is consistent with the Upper Guadalupe River HEC-6 model (Phillip Williams & Associates 1993), which used the MPM-Toffaleti combined grain-size function.

Results. Transport capacities at discrete flows were computed for each reach and plotted in Figure 3-26. A decreasing trend in transport capacity in the downstream direction is apparent for each flow in this figure. Reaches 2 and 3 have relatively similar transport capacities for the range of flows. Relative differences between the reach-averaged transport capacities are more pronounced at the higher peak flows, the 50- and 100-year peak flows, than at the lower flows. The relative magnitudes computed for the range of flows suggest that the less frequent larger events (i.e., 10-year return period and up) presently have a greater effect on channel changes than the more frequent smaller flow events.

These results correlate well with the results of the geomorphic analysis, as described in Section 3.1. Reach 1 is apparently the most stable reach in the profile for the period 1972–1999. This reach has the lowest sediment transport capacity. Reach 4, with the highest sediment transport capacity, has the most entrenched channel form and highest level of channel bed degradation since 1972. The results suggest that channel incision in Reaches 2–4 could be reduced by reducing sediment transport potential in these three reaches to more closely match that in Reach 1.

Additional sediment transport computations will be completed during the final design phase of the Project to estimate sediment supply from upstream, to more closely balance sediment transport capacities between reaches and guide design of the channel/floodplain geometry.

3.2 SOILS AND GROUNDWATER HYDROLOGY

At the most basic level, soil serves as a rooting medium and as a source of water and nutrients for plant growth. Consequently, soil characteristics can significantly influence the suitability of a specific location within the Project area for riparian habitat restoration. Since most woody riparian species require direct access to groundwater for at least part of the year, local groundwater hydrology can also significantly influence habitat restoration suitability. The objective of this portion of the document is to identify and discuss the soil and groundwater conditions that are most likely to influence habitat restoration suitability and restoration design within the Project area. An emphasis is placed on identifying conditions that will likely constrain restoration efforts.

3.2.1 Soils

A review of site-specific soil data gathered during field visits in November 1999 and February 2000 indicates that the two soil features most likely to influence the restoration suitability of the Project area are texture and the presence of potentially root-restrictive subsoil horizons. These soil characteristics and the mechanisms by which they can influence restoration suitability are listed below.

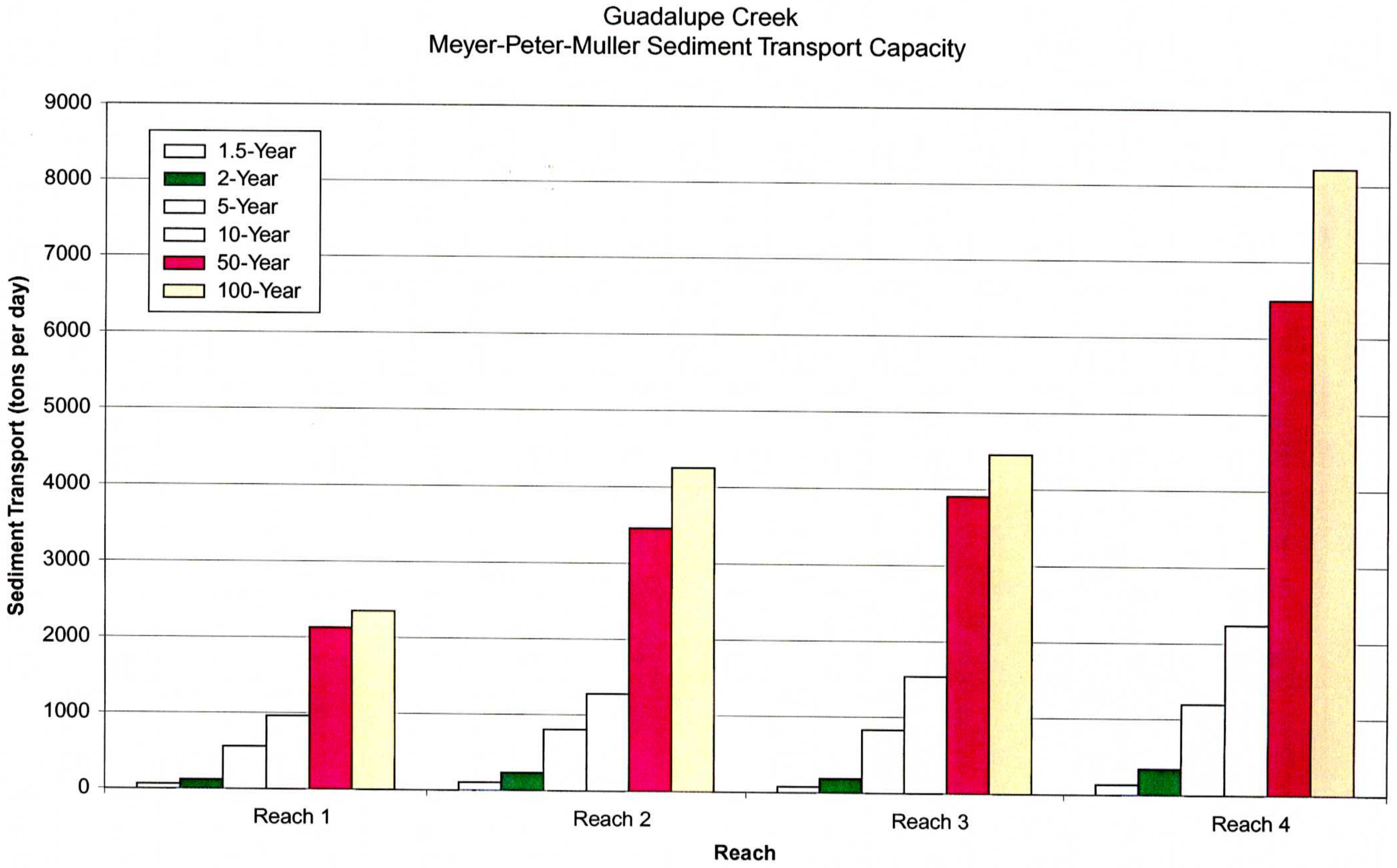

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Figure 3-26
Sediment Transport Capacities

1. High sand and coarse fragment content: Soils with high sand and course fragment content generally have low available water-holding capacities (AWHC), which limits their ability to supply water to plants. Coarse fragments can physically inhibit root penetration if present in high quantities. Sandy soils with high coarse fragment contents occur at various depths in all nine soil map units.

2. Presence of fine-textured subsoil horizons with hard to extremely hard consistency (when dry): These horizons may physically restrict root penetration and limit subsoil permeability, both of which may limit plant growth and survival. Hard subsoil horizons occur most frequently in Soil Map Unit B.

3. Presence of moderately cemented subsoil horizons: These horizons may limit plant growth by restricting root penetration in the subsoil and may impede lateral movement of water from the creek into adjacent soils and sediments. Localized areas of moderately cemented subsoil horizons occur mostly in Soil Map Unit D.

The degree to which each of these soil parameters is expected to influence restoration suitability in each of the nine map units is expressed on a relative scale in Table 3-8. For example, high sand and coarse fragment content is expected to constrain restoration efforts in Soil Map Unit C more than in Soil Map Unit B. Depth to groundwater, which also appears as a potential constraint in Table 3-8, is discussed below.

Soils located upstream from the Project area between Masson Dam and Camden Avenue are similar to the soil in Soil Map Unit A and generally have fewer potential constraints than most of the soil types located within the Project area. These soils contain thicker medium- and fine-textured surface soil horizons than many of the soils in the Project area and lack hard and cemented subsurface soil horizons.

3.2.2 Groundwater Hydrology

The primary method used to investigate groundwater conditions in the Project area and in the upstream area between Masson Dam and Camden Avenue involved measuring:

- groundwater elevations in soil test pits,
- ground-surface elevations at soil test pit locations, and
- surface-water elevations in the main channel next to the soil test pits.

Measurements were taken during site visits in November 1999, February 2000, and March 2000 and used to characterize the shape of and depth to the local water table as it extends laterally from the main channel of Guadalupe Creek.

In addition to these activities, piezometers installed in selected soil test pits during the site visits mentioned above are being monitored on a monthly basis and will be used to track groundwater elevations at various distances from the main channel throughout the year.

3.2.2.1 Project Area

The depth to the water table in soil test pits located within the Project area (soil test pits S1–S28) was measured during field visits on November 17–19, 1999, and February 18, 2000. Ground-surface elevations at these soil test pit locations and surface-water elevations in the main channel adjacent to these soil test pits were measured on November 18-24, 1999, February 24, 2000, and March 9, 2000, using conventional surveying methods.

Groundwater and surface elevation data for the Project area are presented in Table 3-9. In most of the Project area, the data indicate that groundwater elevations decrease significantly relative to surface-water elevations with increasing distance from the main channel (i.e., the groundwater profile is "losing" along most of the Project area). Examples of losing groundwater profiles are shown for linearly arrayed soil test pits in Figures 3-27 and 3-28. The gradient of the losing groundwater profile within 85 feet of the main channel averages approximately 13% but is generally steeper in the downstream sections of the Project area (e.g., Reaches 1 and 2) than in the upstream sections (e.g., Reach 4).

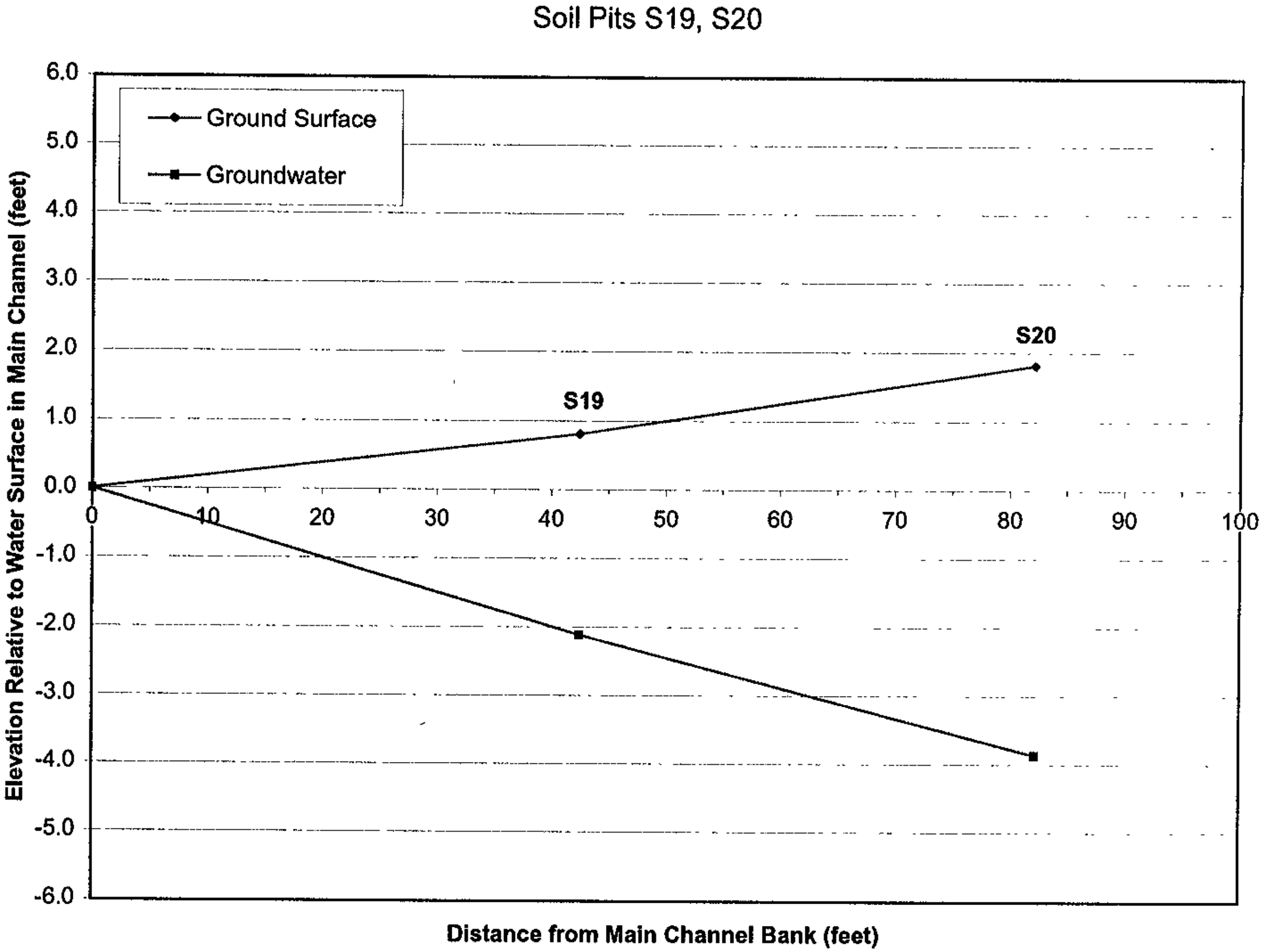
In some sections of the Project area, groundwater elevations increase, remain nearly level, or increase slightly relative to surface-water elevations with increasing distance from the main channel (i.e., the groundwater profile is level or slightly "gaining"). The data indicate that level and slightly gaining groundwater profiles occur primarily in Reach 3 (Appendix A, Baseline Soil Map, Sheets 8 and 9). Examples of a relatively level groundwater profile and a slightly gaining groundwater profile are shown in Figures 3-29 and 3-30, respectively.

Ground-surface elevations increase with increasing distance from the main channel along the entire Project area (Table 3-9, Figures 3-27–3-30). Consequently, the depth to groundwater can be significant in both losing reaches and gaining reaches and is a significant restoration constraint throughout the Project area. However, depth to groundwater can be expected to be a relatively greater constraint along reaches where losing groundwater profiles exist.

Groundwater elevation monitoring data collected from piezometers located within the Project area are limited because relatively little time has past since the piezometers were installed in November 1999 and February 2000. Therefore, these data were not included in this report. They will be included at a later date when more data are available.

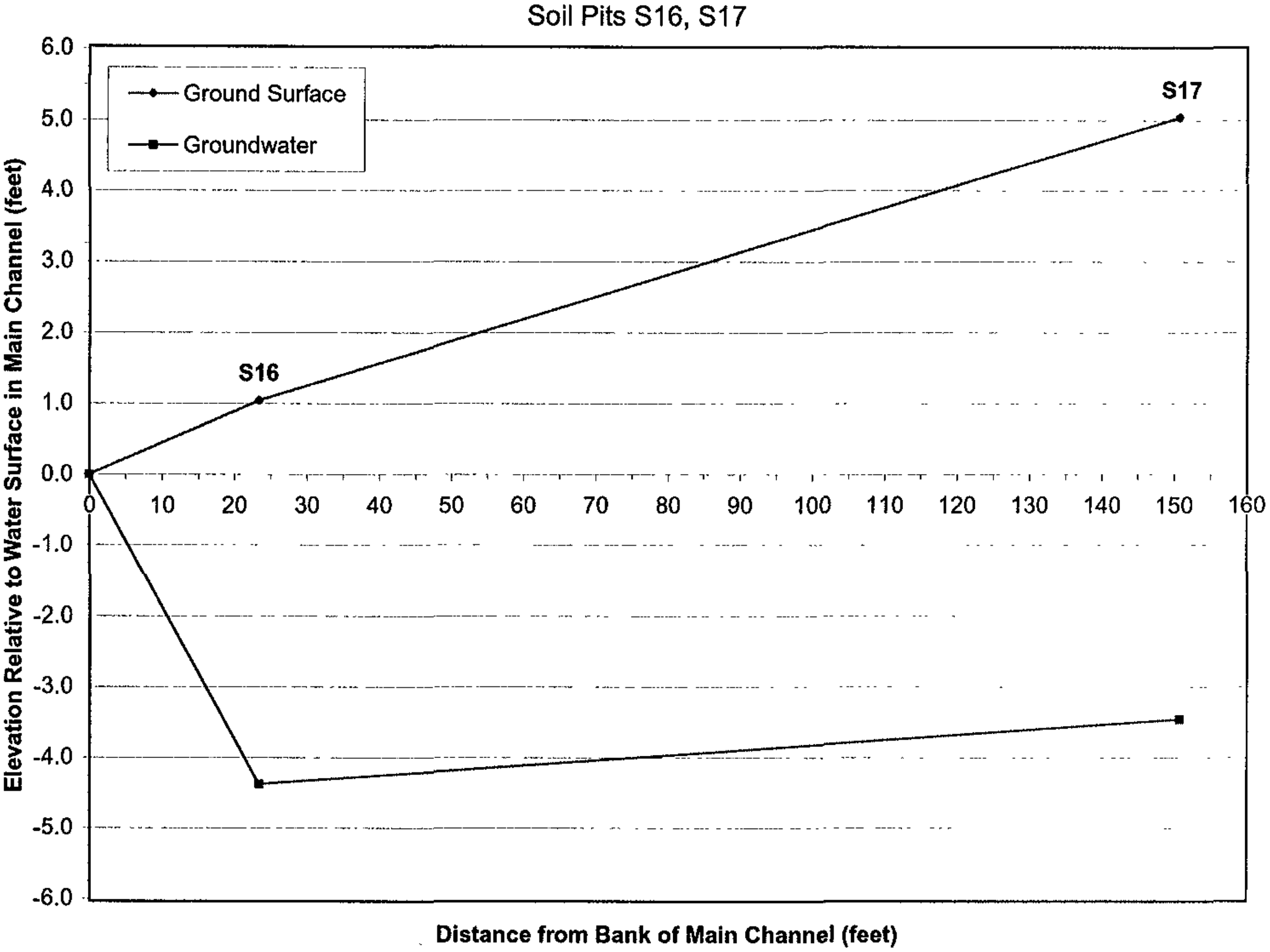
3.2.2.2 Upstream Area between Masson Dam and Camden Avenue

Losing groundwater profiles also predominate in the upstream area between Masson Dam and Camden Avenue (Table 3-10). However, losing groundwater profile gradients in the upstream



Notes:
Elevations are relative to the water surface in the main channel of Guadalupe Creek.
Groundwater elevations were measured on November 17–19, 1999.
Surface-water elevations were measured on November 18–24, 1999.

Figure 3-27
Relative Ground-Surface and Groundwater Elevations at Soil Test Pits S19 and S20



Notes:

Elevations are relative to the water surface in the main channel of Guadalupe Creek.
Groundwater elevations were measured on November 17–19, 1999.
Surface-water elevations were measured on November 18–24, 1999.

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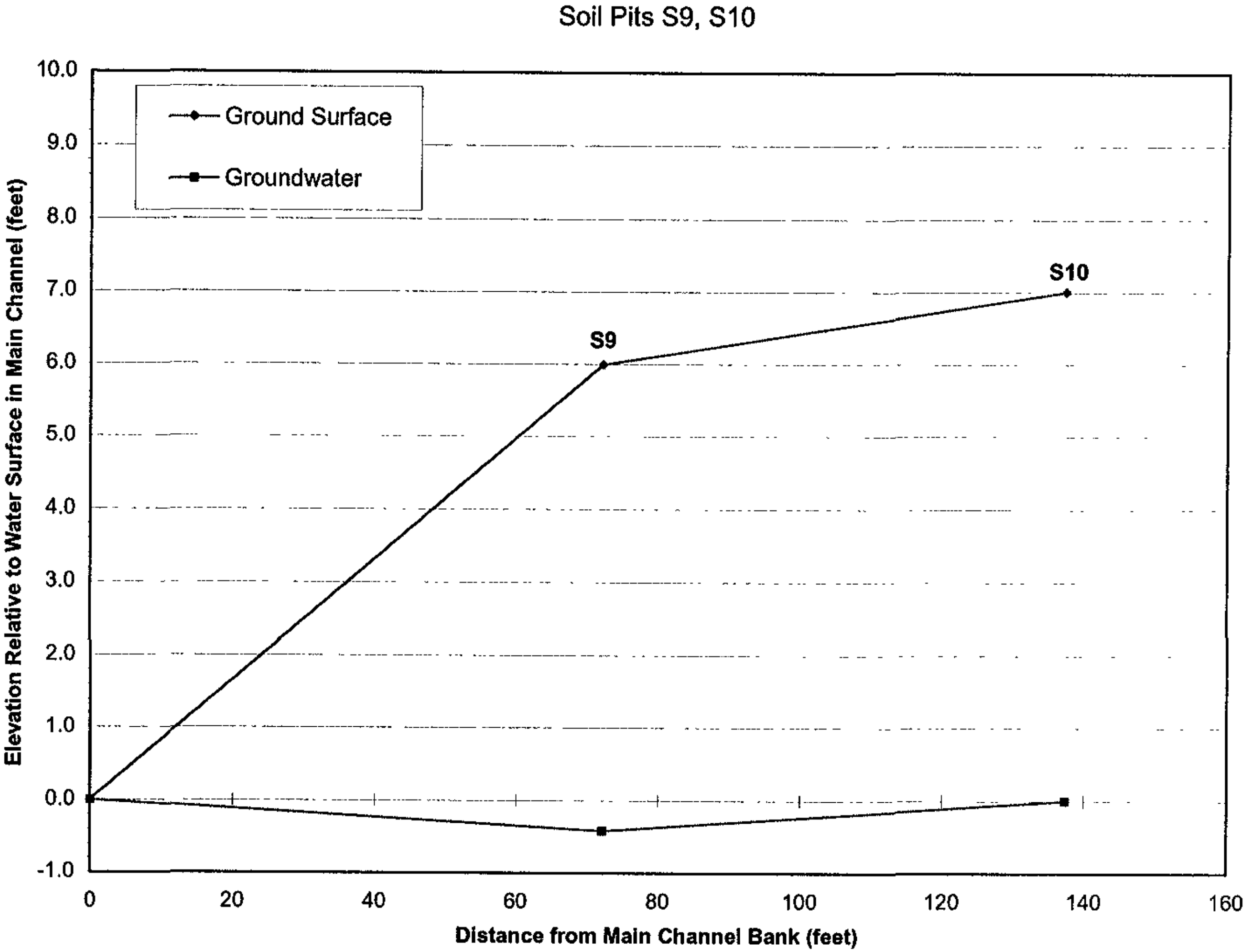
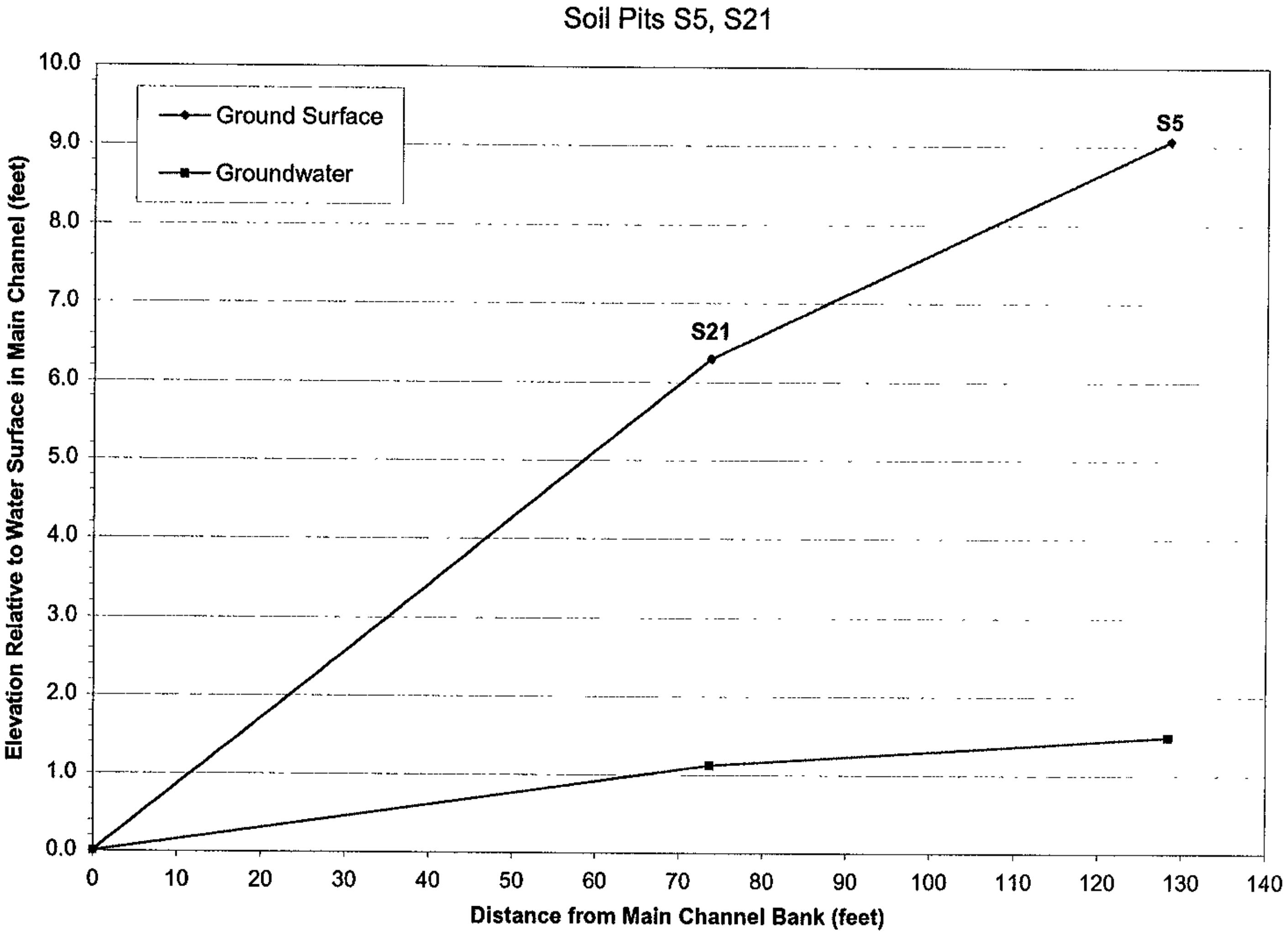
Figure 3-28
Relative Ground-Surface and Groundwater Elevations at Soil Test Pits S16 and S17



Notes:

Elevations are relative to the water surface in the main channel of Guadalupe Creek.
Groundwater elevations were measured on November 17–19, 1999.
Surface-water elevations were measured on November 18–24, 1999.

Figure 3-29
Relative Ground-Surface and Groundwater Elevations at Soil Test Pits S9 and S10



Notes:

Elevations are relative to the water surface in the main channel of Guadalupe Creek.
Groundwater elevations were measured on November 17–19, 1999.
Surface-water elevations were measured on November 18–24, 1999.

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Figure 3-30
Relative Ground-Surface and Groundwater Elevations at Soil Test Pits S5 and S21

Table 3-8. Potential Soil and Hydrologic Constraints of Soil Map Units Located within the Guadalupe Creek Project Area

Soil Map Unit	Potential Constraint	Relative Constraint Level
A, deep groundwater phase	Depth to groundwater table	3
	High sand and coarse fragment content	2
	Fine-textured subsoil with hard consistence	1
	Localized, moderate subsoil cementation	0
B	Depth to groundwater table	2
	High sand and coarse fragment content	1
	Fine-textured subsoil with hard consistence	2
	Localized, moderate subsoil cementation	1
Bd, deep groundwater phase	Depth to groundwater table	3
	High sand and coarse fragment content	2
	Fine-textured subsoil with hard consistence	2
	Localized, moderate subsoil cementation	1
C	Depth to groundwater table	1
	High sand and coarse fragment content	2–3
	Fine-textured subsoil with hard consistence	0
	Localized, moderate subsoil cementation	0
Cd, deep groundwater phase	Depth to groundwater table	3
	High sand and coarse fragment content	2–3
	Fine-textured subsoil with hard consistence	0
	Localized, moderate subsoil cementation	0
Cc, cobbly surface phase	Depth to groundwater table	1
	High sand and coarse fragment content	3
	Fine-textured subsoil with hard consistence	0
	Localized, moderate subsoil cementation	0
D	Depth to groundwater table	1
	High sand and coarse fragment content	2
	Fine-textured subsoil with hard consistence	1
	Localized, moderate subsoil cementation	0–1
Dd, deep groundwater phase	Depth to groundwater table	3
	High sand and coarse fragment content	2
	Fine-textured subsoil with hard consistence	1
	Localized, moderate subsoil cementation	0–1
E	Depth to groundwater table	V
	High sand and coarse fragment content	1–3
	Fine-textured subsoil with hard consistence	V
	Localized, moderate subsoil cementation	V

Notes:

0 = none.
1 = low.
2 = moderate.
3 = high.
V = variable.

Table 3-9. Summary of Groundwater, Surface-Water, and Ground-Surface Elevational Data for Soil Test Pits and Piezometers Located within the Guadalupe Creek Project Area

Page 1 of 2

Soil Test Pit Number	Piezometer Number	Map Sheet Number	Project Reach Number	Distance between Soil Test Pit/ Piezometer and Bank of Main Channel (feet)[a]	Ground-Surface Elevation (feet above MSL)[b,c]	Groundwater Elevation (feet above MSL)[d]	Surface-Water Elevation (feet above MSL)[e,f]	Depth to Groundwater (feet)[f]	Relative Groundwater Elevation (feet)[g]	Relative Ground-Surface Elevation (feet)[g]	Relative Groundwater Profile Gradient (percent)[h]
S1	P1	12	4	ND	ND	ND	ND	9.7	ND	ND	ND
S2	P2	11	4	84.7	243.5	234.0	235.7	9.5	-1.7	7.8	-2.5
S3	P3	11	4	66.3	249.0	238.6	240.8	10.3	-2.1	8.2	-3.2
S4	P4	10	3	55.4	236..9	227.0	229.8	9.9	-2.8	7.1	-5.1
S5	-	9	3	128	233.1	225.5	224.0	7.6	1.5	9.1	1.2
S6	P5	8	3	30.1	227.0	222.8	221.4	4.3	1.3	5.6	4.5
S7	P6	8	3	132	228.3	223.1	221.4	5.3	1.7	6.9	ND
S8	P7	8	3	196	228.7	222.7	221.4	5.9	1.3	7.3	ND
S9	-	8	3	72.2	225.2	218.7	219.2	6.4	-0.4	6.0	-0.6
S10	-	8	3	137	226.2	219.2	219.2	7.0	0.0	7.0	ND
S11	P8	5	1	19.1	210.6	205.3	207.8	5.3	-2.6	2.8	-13.4
S12	-	4	1	28.8	211.0	202.8	205.0	8.2	-2.1	6.0	-7.4
S13	-	3	1	28.3	201.1	194.6	200.0	6.5	-5.4	1.1	-19.1
S14	-	3	1	12.8	199.5	194.3	197.9	5.3	-3.7	1.6	-28.6
S15	-	2	1	9.38	197.0	191.4	194.4	5.6	-3.0	2.6	-31.8
S16	P9	2	1	23.4	195.0	189.6	194.0	5.4	-4.4	1.0	-19.0
S17	P10	2	1	150	199.0	190.5	194.0	8.5	-3.5	5.0	ND
S18	-	4	1	15.4	204.2	199.3	202.7	4.9	-3.4	1.5	-22.3
S19	-	1	1	42.5	191.5	188.6	190.7	2.9	-2.1	0.8	-4.7
S20	-	1	1	82.2	192.5	186.8	190.7	5.7	-3.9	1.8	-5.0
S21	-	9	3	73.7	230.3	225.1	224.0	5.2	1.1	6.3	1.5
S22	P11	1	1	31.54	193.9	188.4	193.2	5.5	-4.8	0.7	-15.2
S23	P12	1	1	60.0	197.6	189.1	194.0	8.5	-4.9	5.6	ND

Table 3-9. Continued

Soil Test Pit Number	Piezometer Number	Map Sheet Number	Project Reach Number	Distance between Soil Test Pit/ Piezometer and Bank of Main Channel (feet)[a]	Ground-Surface Elevation (feet above MSL)[b,c]	Groundwater Elevation (feet above MSL)[d]	Surface-Water Elevation (feet above MSL)[e,f]	Depth to Groundwater (feet)[f]	Relative Groundwater Elevation (feet)[g]	Relative Ground-Surface Elevation (feet)[g]	Relative Groundwater Profile Gradient (percent)[h]
S24	P13	1	1	ND	ND	ND	ND	ND	ND	ND	ND
S25	P14	3	1	10.0	203.4	198.4	200.0	5.0	-1.6	3.4	-16.0
S26	P15	6	2	14.0	213.3	209.8	211.7	3.5	-1.9	1.6	-14.0
S27	P16	7	2	14.0	218.4	214.8	216.4	3.6	-1.6	2.0	-11.0
S28	P17	11	4	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

[a] Measured on baseline soil maps (Exhibit 2).

[b] MSL = mean sea level.

[c] Elevations were surveyed by Northwest Hydraulic Consultants (NHC) using conventional survey methods or estimated using topographic contours on baseline soil maps (Exhibit 2).

[d] Calculated values based on ground-surface elevation measurements taken by NHC and groundwater depth measurements taken by Jones & Stokes.

[E] Surface-water elevations for soil test pits S1–S22 were measured by NHC November 18-24, 1999, using conventional survey methods. Surface-water elevations for soil test pits S23–S28 were measured by NHC on March 9, 2000, using conventional survey methods.

[f] Groundwater depths in soil test pits S1–S22 were measured by Jones & Stokes on November 17-19, 1999. Groundwater depths in soil test pits S23-S28 were measured by Jones &Stokes on February 18, 2000.

[g] Elevation relative to water surface in creek.

[h] Where linearly arrayed soil test pits occur, only the groundwater profile gradient between the main channel and the closest test pits in the array was reported, unless the groundwater levels in test pits located farther from the main channel were significantly different. For example, soil test pits S16 and S17 (Figure 3-28) were linearly arrayed, but groundwater level in S17 did not differ significantly from that in test pit S16. Consequently, only the gradient between the main channel and test pit S16 was reported. Conversely, groundwater elevations in test pits S19 and S20 differed significantly, so both gradients were reported.

ND = Not determined.

Table 3-10. Summary of Groundwater, Surface-Water, and Ground-Surface Elevational Data for Soil Test Pits and Piezometers Located Upstream from the Guadalupe Creek Project Area between Masson Dam and Camden Avenue

Soil Test Pit Number	Piezometer Number	Distance between Soil Test Pit/ Piezometer and Bank of Main Channel (feet)[a]	Ground-Surface Elevation (feet above MSL)[b,c]	Groundwater Elevation (feet above MSL)[b,d]	Surface-Water Elevation (feet above MSL)[b,c,e]	Depth to Groundwater (feet)[f]	Relative Groundwater Elevation (feet)[g]	Relative Ground-Surface Elevation (feet)[g]	Relative Groundwater Profile Gradient (percent)[h]
1	1	73.9	275.1	271.1	ND	4.0	ND	ND	ND
2	2	81.0	270.8	264.7	264.8	6.1	-0.1	6.0	-0.1
3	3	98.6	273.7	267.2	ND	6.5	ND	ND	ND
4	4	63.4	269.9	265.1	265.6	4.8	-0.5	4.3	-0.8
5	5	35.2	263.5	258.4	260.5	5.1	-2.1	3.0	-6.0
6	6	88.0	265.1	259.8	260.2	5.3	-0.3	4.9	ND
7	7	73.9	255.6	250.4	252.4	5.2	-1.9	3.2	-2.6
8	8	161.9	255.6	250.6	252.7	4.9	-2.0	2.9	ND

Notes:

[a] Measured on aerial photograph (scale 1 inch ≈350 feet).

[b] MSL = mean sea level.

[c] Elevations were surveyed by Northwest Hydraulic Consultants (NHC) using conventional survey methods.

[d] Calculated values based on ground-surface elevation measurements taken by NHC and groundwater depth measurements taken by Jones &Stokes.

[e] Surface-water elevations were measured by NHC on February 24, 2000.

[f] Groundwater depths in soil test pits 1–8 were measured by Jones & Stokes on February 18, 2000.

[g] Elevation relative to water surface in creek.

[h] Where linearly arrayed soil test pits occur, only the groundwater profile gradient between the main channel and the closest test pits in the array was reported, unless the groundwater levels in test pits located farther from the main channel were significantly different. For example, soil test pits S16 and S17 (Figure 2) were linearly arrayed, but groundwater level in S17 did not differ significantly from that in test pit S16. Consequently, only the gradient between the main channel and test pit S16 was reported. Conversely, groundwater elevations in test pits S19 and S20 differed significantly, so both gradients were reported.

ND = Not determined.

area are significantly lower than those in the Project area. This difference may in part explain the nearly contiguous growth of riparian vegetation in the upstream area when compared to the Project area.

Groundwater elevation monitoring data collected from piezometers located upstream from the Project area are limited because relatively little time has expired since their installation in February 2000. Therefore, they were not included in this report. They will be included at a later date when more data are available.

3.3 VEGETATION

3.3.1 Historic Vegetation

3.3.1.1 Data Sources

Information for this portion of the document was obtained from historical aerial photographs (Table 3-1), historical topographic maps (Table 3-2), historical survey field notes, and literature cited in Chapter 9, "Citations". Copies of plat maps and field notes from the Public Lands Survey of the 1860s and 1870s were obtained from the California State Library. In particular, the field notes for the surveys of the Rancho de San Juan Bautista of 1860 and Rancho Cañada de Capitancillos of 1871 were of interest. A description of historic geomorphic and land use changes is presented in Section 3.1.1.4., "Historical Geomorphology".

3.3.1.2 Presumed Pre-European Riparian Vegetation

The extensive modification of the landscape along the Project area prior to the availability of aerial photographs makes any inference about the pre-European vegetation condition very difficult to verify. A conceptual reconstruction of the pre-European condition was based on observation of the current vegetation, comparison of the Project area with less disturbed riparian vegetation in the region, and 19th century survey notes and maps.

Lower Guadalupe Creek flowed intermittently over an alluvial fan deposited on the valley floor on coarse-grained alluvium. The 1871 land survey and aerial photographs of 1939 and 1948 show that the channel was intermittently dry in the Project area. Early maps of the area show a widening floodplain at the downstream portion of Reach 1, which had multiple channels and a broad channel bed in 1871 (Section 3.1.1.4., " Historical Geomorphology"). The riparian tree canopy is dominated by widely spaced western sycamore *(Platanus racemosa)* and valley oak (*Quercus lobata*) trees. Sub-dominant tree species include arroyo willow, white alder *(Alnus rhombifolia)*, California bay *(Umbellularia californica)*, coast live oak *(Quercus agrifolia)*, Fremont cottonwood (*Populus fremontii*), and valley oak. Small trees include California buckeye (*Aesculus californica*), blue elderberry (*Sambucus mexicana*), red willow, and sandbar willow. Shrubs include mule fat and snowberry *(Symphoricarpos* spp.*)*. This community, canopy structure, and physical environment conform closely to the sycamore alluvial woodland of Holland (1986) and the California sycamore series in Sawyer and Keeler-Wolf (1995).

3.3.1.3 Native American Traditional Resource Management

The riparian vegetation in the Project area has been drastically modified by human activities. Prior to the Spanish exploration in 1769 and establishment of a mission in San Jose in 1777, native Californians probably substantially modified the vegetation composition and stand structure of the vegetation along lower Guadalupe Creek. The Thamien and Matalan Ohlone tribelets are known to occur in the San Jose area (Margolin 1978). Traditional Resource Management (TRM) was used by the local Ohlone people to tend the Guadalupe Creek landscape prior to European settlement. TRM includes harvesting during specified seasons, replanting, weeding, pruning, aerating the soil through tilling with a digging stick, and limiting harvest. The net result was an open and park-like woodland with lower density between understory plants and long, straight stems on shrubs. Hundred of thousands of sedge rhizomes, grass culms, and straight stems from willow and red bud were needed to make the baskets produced by a single tribelet. A search in the wild for long, straight, slender basketry materials with no lateral branching is largely in vain. In addition to basketry materials, mule fat limbs and branches were pruned to create straight stems for dwelling construction, arrow foreshafts, and fire drills. California buckeye was pruned for arrow shafts. To gain sufficient material to support their cultural needs, the Ohlone people had to manage and maintain abundant populations of certain plants at what was virtually an industrial level.

The Ohlone and other native people extensively used fire as a management tool. The use of fire was the most frequent and effective tool used by California peoples to manage the environment in general and oaks in particular (Harrington 1942, Schenck and Gifford 1952, Kroeber 1925 p. 88). Coast live oak and valley oak are common tree species in the Project area that provided acorns for consumption. An average family could eat up to 1,000–2,000 pounds of acorns per year. Leaves of California bay and mugwort (*Artemisia douglasiana*) were layered in acorn granaries to discourage insect predation.

Large acreages of grasslands were often burned over twice to kill the brush. Burning occurred in spring and fall. After burning, seeds were deliberately sowed into the burned area to cultivate growth for the following year. The following spring grasses, berries, and green herbs emerged (Teaford 1930). A staple food in the Ohlone diet was pinole, a porridge composed of grass and herb seeds. Meadows were burned after harvest. Seeds were harvested for pinole from black sage (*Salvia mellifera*), chia (*Salvia columbariae*), wild grasses, wild sunflower (*Helianthus* spp.), evening primrose (*Oenothera* spp.), morning glory (*Convolvulus* spp.), clarkia seeds (*Clarkia* spp.), tarweed (*Madia* and *Hemizonia* spp.), wild cucumber (*Marah fabaceus*), and curly dock (*Rumex crispus*). Redmaid seeds (*Calendrinia ciliata*) were highly favored.

Fire was also used as a traditional tool to stimulate the growth of green shoots in the spring, berry production later in the season, and reduce competition to stimulate geophyte growth and reproduction. Plants harvested for greens included dock (*Rumex* spp.), clover (*Trifolium* spp.), poppy (*Eschscholzia californica*), and miners' lettuce (*Claytonia perfoliata*). Blue elderberries, blackberries (*Rubus ursinus*), wild grapes (*Vitis californica*), currants and gooseberries (*Ribes* spp.), and strawberries (*Fragaria chiloensis*) were gathered, as well as toyon (*Heteromeles arbutifolia*), madrone (*Arbutus menziesii*), and manzanita (*Arctostaphylos* spp.) berries. Bulbs, corms, and tubers of wild onions (*Allium* spp.), mariposa lilies (*Calochortus* spp.), and wild hyacinth (*Brodiaea* spp.) were dug, cooked, and eaten as a delicacy.

3.3.1.4 Early European Settlement

Spanish exploration of the area started in 1769, and the Mission Santa Clara de Asis was established in 1777 in what is now San Jose. Initially, European settlers used the area for sheep and cattle grazing. With the establishment of the Spanish settlers and the introduction of livestock, a large number of nonnative annual plants rapidly colonized grasslands and woodland understories. Wild oats (*Avena fatua*), ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceous*), storks bill (*Erodium* spp.), and other Mediterranean annual grassland plants quickly established, and native grassland species, in particular native bunch grasses, rapidly declined in abundance in grasslands and woodland understories. Trampling and grazing by livestock probably facilitated the decline of native bunch grasses and reduced regeneration of native woody species, including oaks. Reduction of fire frequency due to a decline in fires set by native people and fire suppression are also likely contributors to the decline of native grassland and woodland understory species. Browsing and trampling by sheep and cattle may have reduced cover of woody riparian species.

Guadalupe Creek was surveyed in the land surveys of the 1860s and 1870s, because it formed the boundary between two ranchos. Plat maps and surveyors field notes indicate stands of valley oak and coast live oak on the uplands and scattered stands of willow and western sycamore near the creeks in the area. The survey field notes suggest that sycamore and valley oak trees were widely spaced along the banks of Guadalupe Creek, then mapped as Arroyo Seco de Guadalupe or Arroyo de Los Capitancillos. The Guadalupe Creek was described as a "dry arroyo" in 1865. At a point near the intersection of Hicks and Kennedy Roads, bearing trees for witness posts include a 16-inch-diameter western sycamore at a distance of 61 feet and a 14-inch-diameter sycamore tree at a distance of 27 feet, suggesting a distance of more than 61 feet between western sycamore trees at that point.

3.3.1.5 Twentieth Century Developments

A comparison of a sequence of aerial photographs for 1939, 1948, 1963, 1980, and 1999 shows that the tree canopy along the channel in the Project area has remained relatively constant over the last 60 years (Figures 3-31–3-33). Most changes in the tree canopy during that period have been the result of direct disturbance of the vegetation due to construction of bridges, percolation dams and ponds, and gravel mining. By 1939, the natural physical processes that drive riparian plant community dynamics had already been dramatically altered from their natural state as the result of grazing, agricultural development, and upstream diversion of water. Many canopies of large trees present in 1939 can still be observed in the 1999 aerial photographs (Figures 3-31–3-33). Valley oak and western sycamore are long-lived, drought-tolerant species that, once established, may survive for many hundreds of years.

Since 1939, the geomorphic, hydrologic, and hydraulic conditions on which long-term dynamics of the riparian plant communities depend have been further modified by construction of percolation dams, development of the Los Capitancillos percolation pond system, widening of the flood corridor, gravel mining, and urbanization (Section 3.1.1.4. "Historical Geomorphology"). The channel incision associated with diversion and mining has probably affected the riparian understory by lowering the water table. The herbaceous understory has probably shifted to more drought-tolerant species and the regeneration potential of oak, sycamore, and buckeye has probably been reduced. These changes cannot be discerned from large-scale black-and-white aerial photographs.

Under current conditions, the flow in Lower Guadalupe Creek, regulated by Guadalupe Dam, is more constant than 60 years ago, when the flow pattern was more intermittent. Apparently, in response to this change, vegetation along the channel appears to be denser in the 1999 aerial photograph than in the earlier photographs (Figures 3-31–3-33). In particular, dense sandbar willow clones occur both upstream and downstream from the Meridian Avenue Bridge in Reach 2. In addition, many white alder seedlings and some saplings appear to have become established recently along the channel, though few large white alder trees are currently present in the Project area. These observations suggest that if establishment sites are created along the channel, including sand bars and low benches, then these species may be expected to increase in cover in the future.

Historically, four gravel spreader dams were placed in Guadalupe Creek for in-channel recharge of groundwater. These dams were made of gravels and finer material to impound water within the channel. The dams were placed in the river in early spring and removed in late fall or winter. From 1986 to 1993, the amount of time the dams remained in place was between 3 and 11 months, with an average of 8 months (Aguilera 2000). The length of creek impounded behind the spreader dams was 4,180 feet (Aguilera 2000). Within Reaches 1 and 2, roughly 80% of the channel was inundated. About 50% of Reach 3 was inundated. Reach 4 did not contain any spreader dams.

The impoundment of water behind the spreader dams can possibly explain some of the natural recruitment patterns observed in Guadalupe Creek. With an average duration of 8 months, the impounded water would kill any seedlings of woody plants that did germinate. The in-channel peculation ponds effectively prevented any natural recruitment within the area of impoundment. This effect can be observed quite clearly at the upstream end of water impoundment of spreader dam 3 (1,300 feet downstream from Meridian Avenue). Large stands of sandbar willow (Appendix A, Baseline Vegetation Map, Sheet 6) have become established, yet have not colonized within the impound area though there are suitable conditions. The same effect can be observed again at cross section 1065 (see Appendix A, Baseline Vegetation Map, Sheet 4). A large patch of willows has established only above the high water of the innundation area.

The District has not operated the spreader dams since 1993 and does not intend to install them in the future. Currently, mule fat and willows are establishing within the areas that were previously inundated. It can be expected that more woody vegetation may establish within these

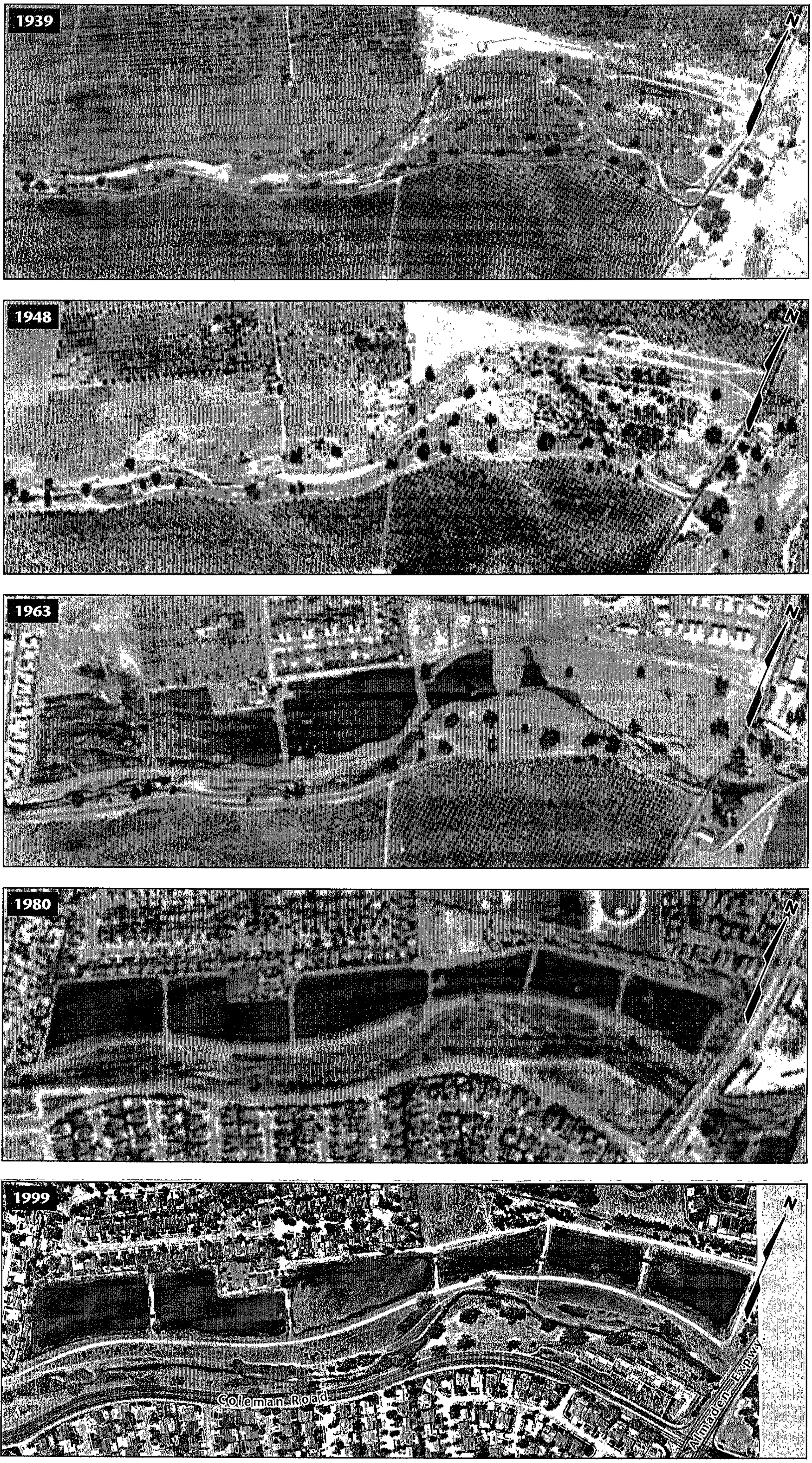


Figure 3-31
Historical Comparison of Guadalupe Creek Reach 1

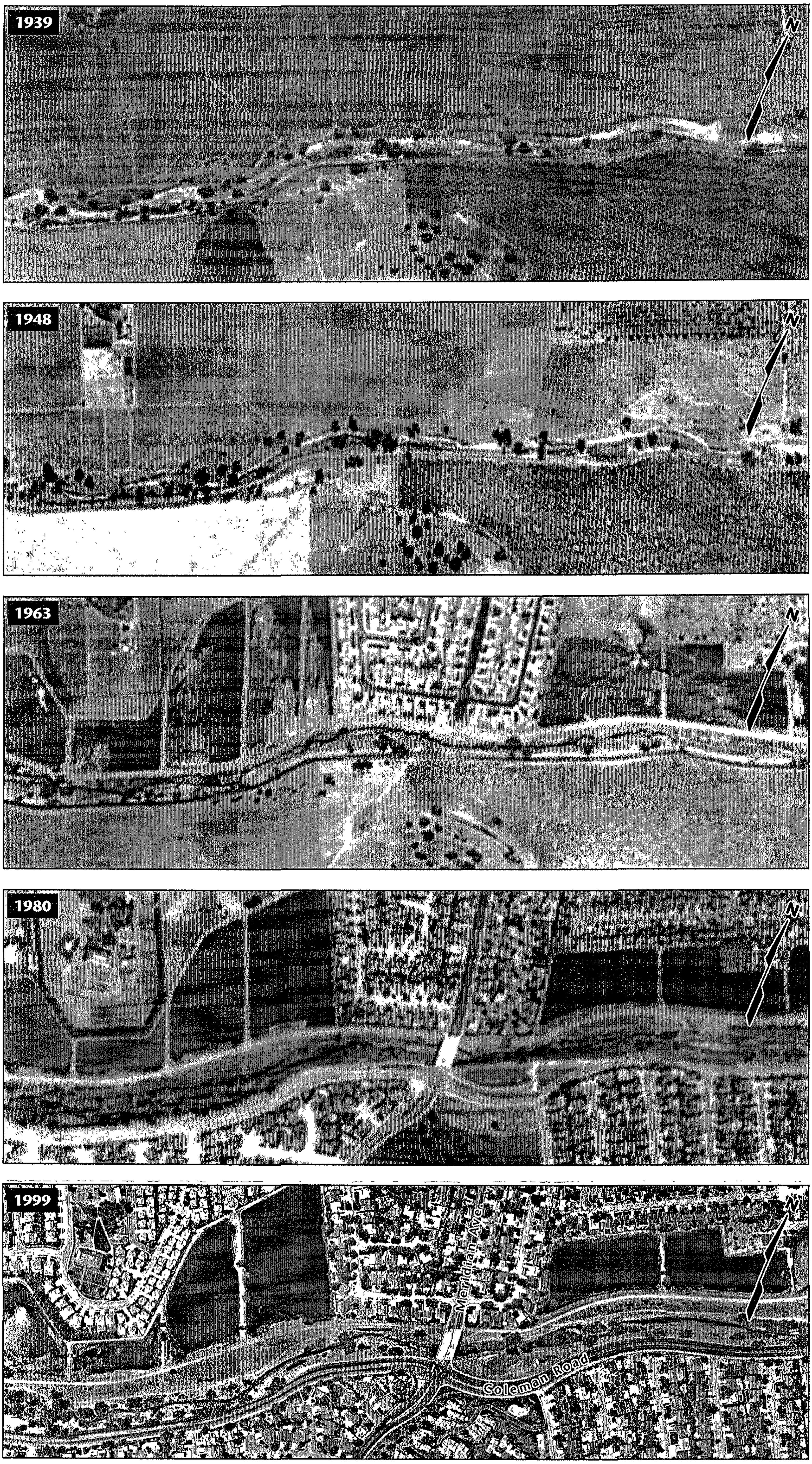
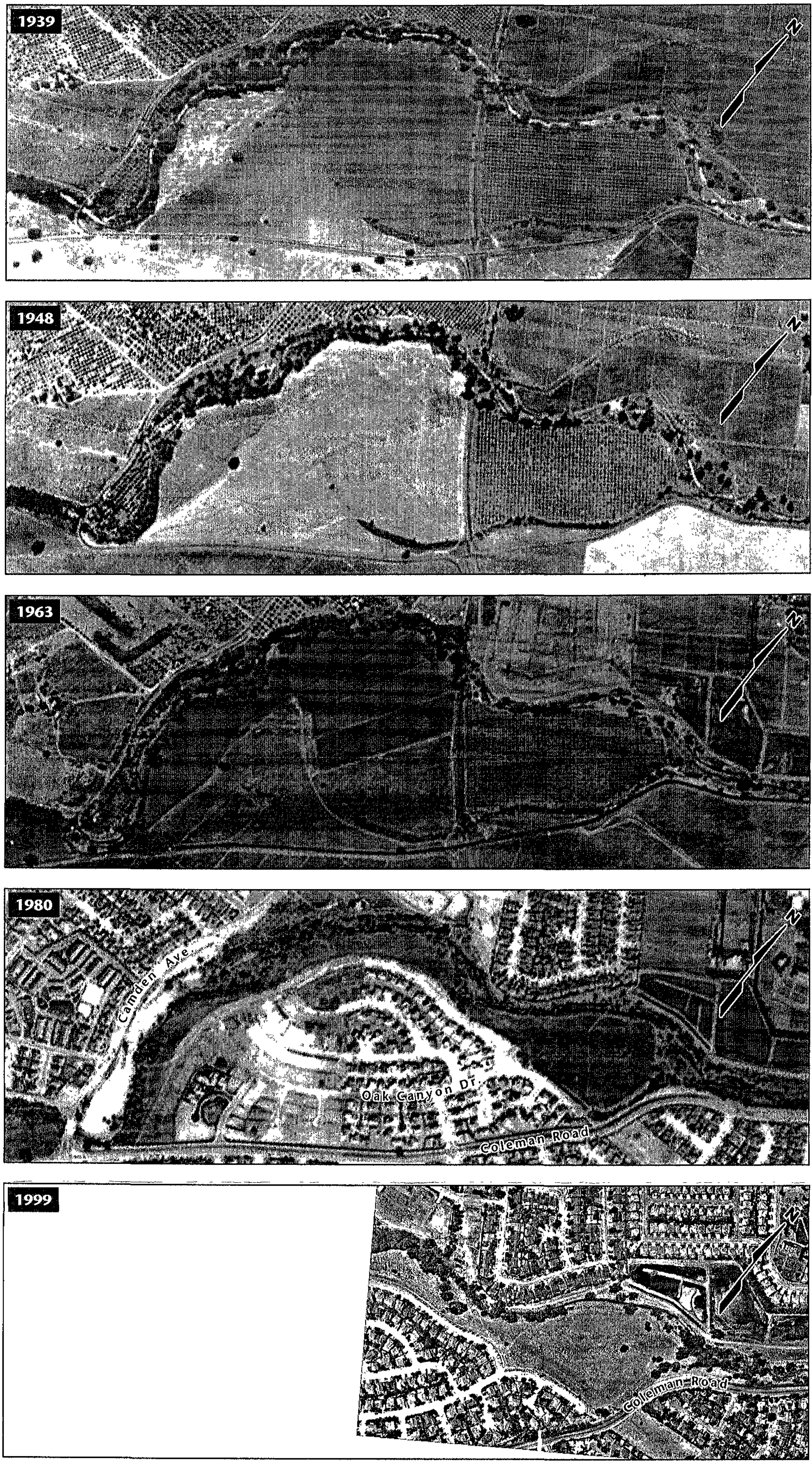


Figure 3-32
Historical Comparison of Guadalupe Creek Reaches 2 and 3



Jones & Stokes

Figure 3-33
Historical Comparison of Guadalupe Creek Reach 4 and Upstream to Camden Avenue

areas. This vegetation and natural recruitment is still constrained by the hydrology of the creek and the scouring flows of the incised channel.

There are some indications that invasive exotic species may have recently expanded, probably as a result of dispersal from yard plantings from recently established residential neighborhoods. In particular, periwinkle (*Vinca major*), fan palm (*Washingtonia filifera*), eucalyptus (*Eucalyptus sp.*), pyracantha (*Pyracantha angustifolia*), and river she oak (*Casuarina equisetifolia*) are species that readily disperse and can become widely established in wildland areas. Since residential development near the Project area is very recent, these invasive species can be expected to increase in the future, if they are not controlled.

3.3.2 Existing Vegetation

The following text includes a discussion on plant community classification, major plant associations within the Project area, vegetation conditions by geomorphic reach, and nonnative invasive plant species.

3.3.2.1 Plant Community Classification

The remnant sycamore islands remaining in the Project area conform to the sycamore alluvial woodland of Holland (1986) and the California sycamore series in Sawyer and Keeler-Wolf (1995). Keeler-Wolf et al. (1997) described Central California sycamore alluvial woodland in detail. The subtype for the general area of the Project area is the mid-coastal alluvial group. Mean tree cover for this type is 57%, but the cover ranges from open woodland to dense forest (10–99% cover). The sycamore alluvial woodland is typically formed on braided, depositional channels of intermittent streams, gullies, springs, seeps, stream and riverbanks, and terraces adjacent to floodplains subject to high-intensity flooding. The alluvial soils are generally cobbly, rocky, and coarse-textured. The upstream portion of the Project area, Reach 4, has a predominance of western sycamore, but the creek has a single-channel configuration with relatively steep slopes and more of a riparian forest-type canopy than a woodland. Vegetation composition is similar to the sycamore alluvial woodland, except that coast live oak, arroyo willow, and Fremont cottonwood become more prevalent.

The CDFG Natural Heritage Data Base developed a terrestrial natural communities classification system to assist in the location and determination of significance and rarity of various vegetation types. These plant communities are listed as high priority for inventory, with the implication that these habitats are relatively scarce on the landscape. The Central California Sycamore Alluvial Woodland and Central California Sycamore-Cottonwood Forest are designated as sensitive plant communities. The tree canopy is dominated by widely spaced western sycamore and valley oak trees. Other tree species include arroyo willow, white alder, California bay, coast live oak, Fremont cottonwood, and black cottonwood (*Populus balsamifera*). Small trees include California buckeye, blue elderberry, red willow, and white alder. Shrubs include mule fat and snowberry *(Symphoricarpos* sp.*)*.

3.3.2.2 Major Plant Associations within the Project Area

During the initial Project area inventory, four types of vegetation were mapped: annual grassland, mesic grassland, shrub/vine scrub, and willow scrub. In addition, the canopy of large trees was mapped. An analysis of the mapped vegetation with an integration of geomorphic understanding of the Project area suggests there are four patterns of plant association:

- vegetation adjacent to the low-flow channel;
- shrub-dominated vegetation along the banks;
- vegetation associated with the residual sycamore islands; and
- areas dominated by annual grasslands.

Vegetation Adjacent to the Low-Flow Channel. White alder, red willow, Fremont cottonwood, and mule fat are establishing along the wetted perimeter of the low-flow channel. Shrub and willow vegetation is almost always found in wide, unconfined channel cross sections, growing within approximately 6 vertical feet of the channel bed and on a gradual slope, typically about 1:10. Plants are successful at the water's edge where the water does not erode vegetation and where there is some base flow to avoid dessication of newly establishing seedlings. There is no evidence of revegetation constraints from soil texture, fertility, or the presence of phytotoxins.

Understory emergent vegetation includes narrow-leaved cattail (*Typha latifolia*), bur-reed (*Sparganium eurycarpum*), water primrose (*Ludwigia peploides*), field mint (*Mentha arvensis*), poison hemlock (*Conium maculatum*), curly dock (*Rumex crispus*), common horsetail (*Equisetum arvense*), soft rush (*Juncus effusus*), nutsedge (*Cyperus eragrostis*), mugwort (*Artemisia douglasiana*), and willow herb (*Epilobium* sp.).

Shrub–Dominated Vegetation along the Banks. Vegetation density is high in this area. Dominant saplings and shrubs along the first terrace include coyote bush (*Baccharis pilularis*), mule fat, Himalayan blackberry, coast live oak, arroyo willow, elderberry, and California sage (*Artemisia californica*). Dominant herbaceous plants include smilo grass (*Piptantherum milaceum*), periwinkle, mugwort, fennel, California poppy (*Eschschulzia californica*), creeping wild-rye (*Leymus triticoides*), wild cucumber (*Marah fabaceus*), cocklebur (*Zanthium strumarium*), Bermuda buttercup (*Oxalis pes-caprae*), curly dock, and California nettle (*Urtica californica*).

Residual Sycamore Habitat Island. Habitat islands dominated by large sycamore trees were protected during past modifications to the creekway (including mining, flood control, and percolation pond construction) and are now elevated above the current floodplain. The large, multitrunked western sycamores are in association with valley oak, mule fat, coffeeberry (*Rhamnus californica*), coast live oak, interior live oak, snowberry (*Symphoricarpos albus*), blue elderberry, olive (*Olea europa*), wax-myrtle (*Myrica californica*), buckeye, Oregon ash (*Fraxinus latifolia*), box elder (*Acer negundo*), California bay, fan palm, California rose (*Rosa californica*), California blackberry (*Rubus ursinus*), Himalayan blackberry, hedge-nettle (*Stachys chamissonis*), periwinkle, cape ivy (*Senecio mikanioides*), poison oak, and wild cucumber (*Marah fabaceus*).

Annual Grassland-Dominated High Terrace. High terraces are dominated by nonnative annual grasses and forbs. These species include wild oat grass (*Avena sativa*), Italian ryegrass (*Lolium multiflorum*), Mediterranean barley (*Hordeum marinum spp. leporinum*), filaree (*Erodium cicutarium*), annual bluegrass (*Poa annua*), smilo grass, ripgut brome, soft chess (*Bromus mollis*), wild radish (*Raphanus sativus*), black mustard (*Brassica nigra*), yellow star thistle, Himalayan blackberry, wild teasel (*Dipsacus fullonum*), fennel, scarlet pimpernel (*Anagallis arvensis*), and horehound (*Marrubium vulgare*). The species composition and plant vigor depends on soil type and the moisture holding capacity of the soil. In general, course-textured soils on the high terraces contain xeric species, such as annual grasses, yellow star thistle, and fennel.

3.3.2.3 Vegetation Occurring along Geomorphic Reaches

The 8,700-foot Project area has been divided into four distinct geomorphic reaches. Each reach has a distinctive vegetation assemblage associated with flow characteristics, soil texture and moisture holding capacity, channel incision, and depth to groundwater.

3.3.2.4 Reach 1

Reach 1 is characterized by large, alternating gravel bars that create a broad channel bed, resulting in wide, shallow flows at relatively low rates. Vegetation along the water's edge is dominated by red willow, cattails, water primrose, and smilo grass. Gravel bars in this reach are essentially unvegetated. Most of the area is dominated by nonnative annual grasses and forbs. Woody vegetation consists primarily of isolated western sycamore, oak trees, coyote bush, and Himalayan blackberry.

3.3.2.5 Reach 2

Reach 2 spans sections of the Project area extending to either side of Meridian Bridge. In 1994, the construction of summer instream percolation dams was halted. In this area, the upstream end of the old instream percolation pond resulted in deposition of fine sediments. Dense rhizomatous stands of sandbar willow occur in this reach. Hypothetically, the fine-textured sediments and prolonged water availability provided an appropriate substrate for successful sandbar willow colonization. Overstory species are sporadic along this reach, with increasing amounts of annual grasses and ruderals characteristic of the high terrace.

3.3.2.6 Reach 3

Reach 3 is characterized by a very wide floodplain bench on the north bank that extends continuously for approximately 1,500 feet. Six large sycamore habitat islands were preserved in this reach, leaving micro-habitats under the canopy with plants characteristic of this vegetation type. Overstory western sycamore are sporadic but increasing in relative cover along this reach.

Significant amounts of annual grasses and ruderals characteristic of the high terrace are also prevalent in Reach 3. Soils tend to be very cemented along the stream banks, precluding most plant species from growing in these areas. Red willow and alder colonize the streamside vegetation zone. Most of this reach was flooded during the summer months behind the instream spreader dams. This flooding most likely killed any seedlings that would have germinated in the spring.

3.3.2.7 Reach 4

Reach 4 exhibits an entrenched channel cross section that is narrow and confined compared to other geomorphic reaches. Vegetation includes the presence of more trees and woody vegetation than in other reaches. Species characteristic of the Central California Sycamore-Cottonwood Forest, including sycamore, Fremont cottonwood, coast live oak, elderberry, mule fat, poison oak, mugwort, horehound, and wild cucumber, are dominant in this reach. Alder, Fremont cottonwood, and red willow are colonizing the wetted perimeter of the low-flow channel. There is high structural diversity in the vegetation and more shade for the creek in this reach. The Phase 1 riparian plantings are located in this reach.

3.3.2.8 Nonnative Invasive Plant Species

Weed species occurring onsite include yellow star thistle, periwinkle, cocklebur (*Xanthium strumarium*), Himalayan blackberry, wild teasel, Peruvian pepper tree (*Schinus molle*), blackwood acacia (*Acacia melanoxylon*), Eucalyptus, pyracantha, river she oak (*Casuarina equisetifolia*), cape ivy, scotch broom (*Cytisus scoparius*), fennel, wild oat, Farmer's foxtail, filaree, and black mustard (*Brassica nigra*).

3.3.3 Natural Recruitment of Native Plants

3.3.3.1 Limits on Natural Recruitment and Propagule Availability

Natural recruitment is limited in the Project area. Sycamore cottonwood riparian forest occurs upstream from the Project area, providing a source of propagules for natural recruitment of riparian species. Although this source exists, little natural recruitment is present. Seeds are dispersed through wind, water, and animal vectors, such as birds and mammals. Plants such as California buckeye, sycamore, and oaks are often not dispersed far from the parent plant without an animal vector.

Seeds have difficulty germinating and growing to maturity due to the following:

- scouring and erosion that occurs during peak flows,

- seed dispersal occurring during summer and fall when stream flows are low due to seasonal drought in the Project area,
- dessication of seedlings due to sharply declining hydrograph,
- a constricted wetted perimeter during summer low flows,
- groundwater recharging the regional aquifer with average water table depths of 8 feet,
- coarse-textured or cemented soils with low moisture holding capacity, and
- competition with annual grasses and other exotic weeds.

Unfortunately, there are also sources of weeds upstream and adjacent to the Project area, including residential areas and disturbed ground, resulting in a high potential for infestation of plants such as scotch broom, Himalayan blackberry, cape ivy, periwinkle, star thistle, and others.

3.3.3.2 Natural Recruitment Plan Guilds

Growth and reproduction of dominant woody plants in the Project area are illustrated in Table 3-11. These data were used to develop four natural recruitment guilds that correspond to the four intergrading plant communities designed for the Project area.

Guild 1. Guild 1, the riparian forest, includes Fremont cottonwood, arroyo willow, red willow, and alder. These species require lower surface elevations adjacent to the low-flow channel for germination of seeds. Seed dispersal is synchronous with peak hydrologic discharges, resulting in an increased potential for seedling establishment. These species also reproduce vegetatively, grow rapidly, provide abundant shade, and have the potential to contribute large woody debris to the stream over time.

Guild 2. The following species are well adapted to lower first terrace surface elevations for natural regeneration: mule fat, box elder, Oregon ash, western sycamore, elderberry, snowberry, and California blackberry. The seed dispersal period of these species occurs in late fall, with germination occurring with the first winter rains. These species are fairly drought tolerant and tolerate moderate shade and leaf litter development on the soil surface.

Guild 3. The following plants are characteristic of the more xeric second terraces of the sycamore alluvial woodland and tolerate drier conditions once established. These species include buckeye, coyote brush, coast live oak, interior live oak, valley oak, elderberry, California sage, California rose, and California bay. With irrigation, these species are likely to have good regeneration success.

Guild 4. Micro-habitats associated with large woody debris and sandbars within the waterway provide a suitable substrate for species that require moist soil conditions, tolerate inundation, and rely on vegetative reproduction for at least some of their life history. These species include sandbar willow, red willow, alder, Santa Barbara sedge (*Carex barbarae*), wooly sedge (*C. lanuginosa*), mint, rush (*Juncus effusus*), bur-reed, cattail, and nut sedge (*Cyperus eragrostis*).

3.3.4 Guadalupe Creek Phase 1 Planting Survey

3.3.4.1 First-Year Survey Results of Phase 1 Planting

Of the 303 individual plants that were planted and survived the first year, seven plant species seem well-adapted to Project area conditions (see Table 3-12). These species are red willow, mule fat, box elder, western sycamore, Fremont cottonwood, valley oak, and blue elderberry. Planted species that seem to have very high mortality include white alder, California buckeye, California rose, sandbar willow, and arroyo willow. Natural recruitment occurring in this area included mule fat, red willow, western sycamore, blue elderberry, and one white alder. Box elder, white alder, mule fat, red willow, and arroyo willow produced the most height during the first year.

Table 3-12. Phase 1 Revegetation Summary for Guadalupe Creek

Scientific Name	Common Name	Number Survived	Number of Volunteers	Average Height (feet)
Acer negundo	box elder	31	0	4.8
Alnus rhombifolia	white alder	4	1	5.1
Aesculus californica	buckeye	13	0	6.4
Baccharis salicifolia	mule fat	52	31	2.2
Platanus racemosa	sycamore	30	8	3.9
Populus fremontii	cottonwood	28	0	2
Quercus lobata	valley oak	39	0	3
Rosa californica	rose	12	0	2
Salix exigua	sandbar willow	5	0	4.7
Salix laevigata	red willow	55	17	7.8
Salix lasiolepis	arroyo willow	2	0	2.9
Sambucus mexicana	elderberry	32	2	
Total		303	59	

3.3.5 Project Area Constraints - Trends Without Project

3.3.5.1 Project Area Conditions

Based on historic evidence, Project area conditions are likely to remain unchanged without altering peak flow velocity, lowering surface elevations closer to the low-flow channel, irrigating during plant establishment, and controlling weeds. Little change in Project area vegetation characteristics has been observed over the past 60 years. Channel planform from 1948 to 1978 mapping is nearly identical, reflecting the general stability in the river channel for the period.

Common Name	Scientific Name	Mature Height (feet)	Surface	Available Soil Moisture	Shade Tolerance
Box elder	*Acer negundo*	76	nd Terrace	Mesic	Moderate
California buckeye	*Aesculus californica*	42	errace	Mesic	Shade
White alder	*Alnus rhombifolia*	79	dge, moist	Aquic	Light
California sage	*Artemisia douglasiana*	1–3	errace	Xeric	Light
Mulefat	*Baccharis salicifolia*	13	d Terrace	Mesic	Moderate
Oregon ash	*Fraxinus latifolia*	60–80	d Terrace	Mesic	Moderate
Western sycamore	*Platanus racemosa*	80	dge, 1st ace	Phreatophytic	Moderate
Fremont cottonwood	*Populus fremontii*	102	dge, 1st ace	Phreatophytic	Light
Black cottonwood	*Populus balsamifera*	102	dge, 1st ace	Phreatophytic	Light
Coast live oak	*Quercus agrifolia*	75	rrace	Xeric	Moderate
Valley oak	*Quercus lobata*	102	d Terrace	Phreatophytic	Moderate
Interior live oak	*Quercus wislizenii*	62	errace	Xeric	Moderate
Willow	*Salix* spp.	20–30	dge, 1st ace	Aquic, Mesic	Light
Blue elderberry	*Sambucus mexicana*	19	d Terrace	Mesic	Moderate
Snowberry	*Symphoricarpus albus*	1–2	rrace	Mesic	Shade
California bay	*Umbellularia californica*	78	rrace	Xeric	Shade

However, due to recent urbanization, invasive exotic species may be expected to increase in abundance in the future.

3.3.5.2 Plant Recruitment

Plant recruitment is limited by Project area geomorphology and hydrology. Peak flows erode both sandbar sediments and establishing vegetation.

3.3.5.3 Water Availability

Seedlings dessicate rapidly as water becomes unavailable by April or May. Available water leaves soil surfaces outside the wetted perimeter of the low-flow channel fairly rapidly. The District maintains flows of 3–4 cfs downstream from Masson Dam. Approximately 2.5–3.5 cfs of this flow infiltrates into the subsurface between Masson Dam and Almaden Expressway. The District attempts to maintain a minimum of 0.5 cfs in the creek at Almaden Expressway. During extended dry periods, the storage capacity of Guadalupe Reservoir is not sufficient to maintain flow in the creek for the entire year.

3.3.5.4 Soil Condition

The substrate for seed germination and seedling establishment is very poor for the majority of the Project area. Soils are coarse textured with very low moisture holding capacity or are cemented.

3.3.5.5 Depth to Groundwater

It is difficult for roots to penetrate to the permanent water table. Most of the Project area has a losing water table, with groundwater averaging 8 feet below the soil surface.

3.3.5.6 Wetted Perimeter along Low-Flow Channel

Natural vegetation persists and will continue to persist in a narrow band along the creek where adequate water is available. Willow, alder, and mule fat establish along the wetted perimeter of the low-flow channel, along with wetland vegetation such as bur-reed, mint, horsetail, mugwort, and willow-herb. Shallow river channels and warm water temperatures during summer low flows result in dense layers of creeping macrophytes, particularly smartweeds (*Polygonum* spp.), water primrose, and filamentous algae.

3.3.5.7 Sediment Accretion

Currently, there is limited deposition of fine-grained sediments in the channel.

3.3.5.8 Loss of Large Sycamores

Large western sycamores may fall into the creek as their roots are eroded and the toe of the bank becomes more undercut as the channel continues to incise. In reaches where the channel continues to incise, the distance between the channel and the floodplain would be greater, so plants continue to be higher and drier.

3.3.5.9 Invasive Weeds

Many weedy plants that are well-adapted to the conditions may readily colonize the Project area. Project area conditions are suitable for tamarisk, giant cane, star thistle, annual grasses, Himalayan blackberry, and escaped ornamental plants. These and other weedy exotic species are likely to continue to expand in the Project area if no future action occurs.

3.4 FISHERIES

This portion of the document describes existing and desired conditions for aquatic habitat for the Project area. An emphasis has been placed on species listed under ESA, and on candidate species, including steelhead (*Oncorhynchus mykiss*) and chinook salmon (*Oncorhynchus tshawytcha*); and the habitat of these species.

3.4.1 Fish Occurrence

3.4.1.1 Steelhead

Steelhead found in the Guadalupe River basin are considered part of the Central California Coast evolutionarily significant unit (ESU). Only winter steelhead occur within the Central California Coast ESU (61 FR 41541-41561, August 9, 1996). Generally, adult steelhead within this ESU may start to enter rivers from October (in larger basins) through late November (in smaller basins) and may be present in the river through June. Adult spawning begins in November in larger basins and December in smaller basins and can continue though April, with a peak in February and March (61 FR 41541-41561, August 9, 1996). Because little additional life-history information exists for steelhead in this ESU, the following life-history information is summarized from Shapovalov and Taft (1954), who conducted one of the most comprehensive investigations of steelhead life history in the Central California Coast ESU as part of studies conducted on Waddell Creek in Santa Cruz County.

Adult steelhead leave the ocean to migrate up coastal streams and inland rivers with high flows from early November through early May, though the majority probably enter fresh water from late December though late April (Table 3-13). The timing and rate of migration depend on several factors, including stream discharge and water temperatures. Depending on the sexual maturity of the fish, spawning probably peaks from January through March. Adult steelhead spawn in shallow nests constructed in relatively clean, loose gravels, typically at the end of pools and at the head of riffles that have appropriate water depths and velocities. Unlike all Pacific salmon, which die after spawning, adult steelhead are capable of returning to the ocean after spawning, typically by June of that same year (Shapovalov and Taft 1954).

Table 3-13. Temperature Requirements (°F) for Life Stages of Chinook Salmon and Steelhead during the Months Present in the Guadalupe River

Life Stage	Chinook Salmon	Steelhead
Pre-spawning adults	August–December	November–April
Optimal	46.4–53.6	44.0–57.0
Suboptimal	53.6–75.2	57.0–65.0
Unacceptable	>75.2	>65.0
Egg incubation	October–March	January–May
Optimal	41.0–57.2	44.6–53.6
Suboptimal	57.2–60.8	53.6–60.8
Lethal	>60.8	>60.8
Juvenile rearing	January–June	All Months
Optimal	53.6–64.4	53.6–64.4
Suboptimal	64.4–75.2	64.4–77.0
Lethal	>75.2	>77.0
Juvenile emigration	February-June	January–July
Optimal	53.6–64.4	44.6–59.9
Suboptimal	64.4–75.2	59.9–66.2
Unacceptable	>75.2	>66.2

Sources: Raleigh et al. 1984, 1986; Rich 1987; Shapovalov and Taft 1954; Moyle 1976.

Steelhead eggs incubate within the gravel and hatch after approximately 19–80 days at water temperatures ranging from 60 to 40 °F. The average incubation period is approximately 4–6 weeks. After hatching, the young fish (alevins) remain in the gravel for an additional 2–6 weeks before emerging and taking up residence in the shallow margins of the stream. The juvenile fish feed primarily on aquatic and terrestrial insects for periods ranging from less than 1 year to 4 years. Most juvenile steelhead spend 1–3 years in fresh water before migrating to the ocean as smolts (Shapovalov and Taft 1954).

Steelhead smolt, those juveniles developed sufficiently to live in salt water, typically migrate to the ocean as flow declines and water temperature increases in April–June. Before their downstream migration, juveniles undergo physiological changes (smoltification) to prepare them for life in the saltwater of the ocean. Steelhead live in the ocean for 1–3 years before maturing and returning to fresh water to spawn. Because juvenile steelhead rear year-round in fresh water, adequate flows and water temperatures and an abundant food source are necessary throughout the year to sustain steelhead populations. Conditions adequate to sustain steelhead populations are especially important during summer, when declining flows could reduce habitat availability, water temperatures could exceed the species' tolerance levels, and rearing juveniles experience increased competition for living space and food. It has not been determined whether juvenile steelhead rear though the summer in the Guadalupe River, where water temperatures in summer often exceed 70 °F.

Historically, steelhead potentially existed throughout the Guadalupe River system (Skinner 1962); however, after completion of Almaden and Guadalupe Reservoirs in the mid-1930s and Lexington Reservoir in 1952, steelhead migration was restricted to tributary streams downstream from the dams. Prior to the fall of 1999, steelhead entering the Guadalupe River system were prevented from migrating to upstream spawning and rearing areas on the tributary streams by the District's Alamitos drop structure, located downstream from Almaden Lake. The Alamitos drop structure was originally constructed in the 1930s and reconstructed in 1977. Consequently, any steelhead entering the Guadalupe River system were forced to spawn in the Guadalupe River and in Los Gatos and Ross Creeks. The Alamitos drop structure blocked salmonid fish passage until the construction and opening of the fish passage ladder in 1999.

Rainbow trout in Guadalupe Creek may be part of the Central California Coast ESU for steelhead. The presence of rainbow trout on Guadalupe Creek has been well documented. In the 1950s, CDFG documented the presence of rainbow trout in Guadalupe Creek from Camden Road upstream to Guadalupe Dam, in Pheasant Creek, and in Rincon Creek (upstream from Guadalupe Reservoir) (Leidy 1984). In December 1986, The Habitat Restoration Group collected rainbow trout at three sites along Guadalupe Creek, from the District's stream gage station on Hicks Road to approximately 1 mile downstream from Guadalupe Reservoir. Rainbow trout were collected from lower Guadalupe Creek upstream and downstream from Masson Dam during sampling in the early 1990s (The Habitat Restoration Group 1994). In 1997, rainbow trout were collected during May at SCVWD's stream gage station on Hicks Road and immediately downstream from Masson Dam in July. In general, rainbow trout in Guadalupe Creek appear to be most abundant from Guadalupe Reservoir downstream to Camden Avenue (U.S. Army Corps of Engineers 2000).

3.4.1.2 Chinook Salmon

Although there is no historical account of chinook salmon migrating and spawning in the Guadalupe River, fall-run chinook salmon have occurred in the Guadalupe River at least during the last decade. The current chinook salmon population may be strays from wild or hatchery populations from the Sacramento-San Joaquin River system (The Habitat Restoration Group 1994, Santa Clara Valley Water District 1997b). The results of a genetic analysis of these fish conducted to determine their origin have been inconclusive, though some adults were clearly from the Sacramento River watershed (Nielsen 1995). The Central Valley fall/late-fall ESU includes fall- and late-fall-run chinook salmon that spawn in the Sacramento and San Joaquin River drainages of northern California's Central Valley. The overall population abundance for chinook salmon in this ESU is relatively high; however, the abundance of naturally produced fish is declining. Natural production is especially low in the San Joaquin River drainage (63 FR 11481; March 9, 1998).

Adult fall-run chinook salmon migrate into rivers from July though December and spawn from early October through late December (Table 3-13). Spawning peaks in October–November, though the timing of the runs varies from year to year. Eggs incubate from October through March and juveniles rear and migrate from January through June. The majority of young fall-run chinook salmon migrate to the ocean during the first few months following emergence.

All chinook salmon require cold, fresh water streams with suitable gravel for reproduction. Females deposit their eggs in redds that they excavate in the gravel bottom in areas of relatively swift water. Chinook salmon currently migrate up the Guadalupe River and, to a lesser extent, Lost Gatos Creek to spawn. Data on spawning adult abundance are limited. Spawning occurs from above the influence of tidewater through the Project area of Guadalupe Creek, though the majority of chinook salmon appear to spawn in and around the downtown San Jose area. Eggs hatch in approximately 6–12 weeks, and newly emerged larvae remain in the gravel for another 2–4 weeks until the yolk is absorbed (Moyle 1976, Beauchamp et al. 1983, Allen and Hassler 1986). For maximum survival of incubating eggs and larvae, water temperatures must be between 41 and 57 °F. After emerging, chinook salmon fry tend to seek shallow, nearshore habitat with slow water velocities and move to progressively deeper, faster water as they grow. Juveniles rear in fresh water for up to 5 months before migrating to sea. Chinook salmon spend 2–4 years maturing in the ocean before returning to their natal streams to spawn. All adult salmon die after spawning (Moyle 1976, Beauchamp et al. 1983, Allen and Hassler 1986, Raleigh et al. 1986).

3.4.1.3 Other Species

Other species known to occur within the Project area include both native and introduced species, such as the native Pacific lamprey (*Lampreta tridentata*), Sacramento sucker (*Catostomus occidentalis*), California roach (*Hesperoleucas symmetricus*), the introduced goldfish (*Carrassius auratus*), and green sunfish (*Lepomis cyanellus*). Introduced largemouth bass (*Micropterus salmoides)* are also suspected to occur within the Project area because they are found upstream in the Guadalupe reservoir as well as downstream in the Guadalupe River. Crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), green sunfish, and largemouth bass are also suspected to be present in the Los Capitancillos percolation ponds adjacent to the Project area.

Several nonnative species, including largemouth bass and sunfishes, may compete with steelhead and chinook salmon for food or suitable habitat and prey on salmonid larvae and juveniles. Vulnerability of juvenile salmonids to predation increases at human-made structures, such as dams, weirs, and impoundments, where fish are concentrated, stressed, or delayed in their downstream migration. Vulnerability of juvenile salmonids to predation can also increase if water temperatures approach tolerable levels or if channel structure creates conditions that increase the abundance of predatory fish. Some of the deep pools found within the Guadalupe Creek Project area are suspected to be too deep to flush out the deeper bodied introduced species during high winter flows.

3.4.2 Habitat Structure

3.4.2.1 Overhead Cover

Riparian vegetation, including SRA cover vegetation, provides fish with cover from predators; provides streambank stability; increases habitat complexity; provides insects, a food source for juvenile salmonids, with attachment sites; and provides shade, which is important in maintaining water temperatures within ranges suitable for all life stages of fish.

The amount of stream shading, based on the stream covered by overwater vegetation, varies considerably within the Project area but is generally very low. Guadalupe Creek has approximately 12% of stream area shaded by canopy. For juvenile steelhead, at least 50% of the stream areas should be shaded (Raleigh et al. 1984). The lack of canopy cover has contributed to stream temperatures through the reach that approach unhealthy levels for steelhead during the summer.

3.4.2.2 Instream Cover

Instream cover is an important component of fish habitat. Steelhead abundance is directly correlated with the amount of instream cover (Raleigh 1984). Instream cover includes undercut banks with an undercut width greater than 10 centimeters (cm); roots, logs and debris piles greater than 1000 cm^2 in surface area; and boulders and rocks greater than 20 cm in diameter (Jones & Stokes 1997, Fris and DeHaven 1983). Wood and boulders add complexity by defining the thalweg and by scouring pools and slow water eddy habitat. Cover for adult trout consists of areas of obscured stream bottom in water that is at least 15 cm deep with a velocity of at least 15 cm/second. In larger streams, the abundance of trout at least 15 cm in length increased with water depth; most trout were at depths of at least 15 cm. Cover area of at least 25% of the total stream area provides adequate cover for adult trout; cover area of greater than 15% is adequate for juveniles (Raleigh 1984).

Instream woody material (IWM) is an important part of ecological function in headwater streams. Ecologist define IWM as any piece of wood at least 10 cm in diameter at the small end and at least 1.5 meters in length. IWM includes whole trees, broken tops, branches and root wads. Larger pieces are more likely to affect stream channel morphology, and entire trees with root wads are more likely to make long-term contributions to instream habitat and channel morphology. IWM provides primary and secondary productivity, provides integral fish habitat, and controls sediment yield in watersheds. IWM provides grazing surfaces, food source and sediment and seston traps for invertebrates. During high flows sediments are trapped and stored, providing additional spawning gravels for anadromous fish. (Robison and Beschta 1990; Bilby and Ward 1991; Fausche and Northcote 1992; Crispin et al. 1993; Beechie and Sibley 1997.)

Large, fallen trees affect live vegetation along watercourses. Trees carried by flood waters can severely batter live plants on a floodplain but normally only in a narrow belt along the immediate channel. On the other hand, large, stabilized pieces of wood protect riparian sites where riparian plants can become established. Live vegetation eventually stabilizes a stream channel. Features such as gravel bars also become stabilized and enriched with fine sediments and organic materials as plant root systems develop and the stems resist the flow of water and reduce water velocity. (Sedell et al 1988) Willows and alders have been slow to establish in the Project area, which may be due to channelization, downcutting, and ground water depth. Flows are too high and fast during the high flow period, scouring young willow and alder seedlings away.

Habitat complexity in the Project area is poor because existing woody material in the stream is too small to remain in place to actively enhance habitat and geomorphology. Live sycamore root masses that have been exposed by flows are an important part of the woody material in Guadalupe Creek. These root masses have helped scour pools and are currently good habitat for juvenile and adult salmonids. Undercut banks also occur throughout the Project area. Approximately 110 feet of streambank is undercut more than 10 cm. Undercut banks found on Guadalupe Creek are generally associated with the live sycamore root masses that have scoured pools.

3.4.2.3 Pool Habitat

Pools differ in the amount and quality of escape cover, winter cover, and resting areas that they provide. Relatively large and deep pools are needed to provide a low velocity resting area for adult fish. More than 20% of the pools should have the pool bottom obscured by surface turbulence or the presence of structures such as logs, debris piles, boulders, or overhanging banks and vegetation. The dominant pool forming elements are IWM, boulders, and bedrock protrusions (Dolluff 1994). Table 3-14 describes the different types of pools that can be found in streams, how they are formed, and where they are found in the channel. Pools provide cover and resting areas for adult fish. More fish can hold in larger pools. Pools are also needed as juvenile habitat, providing needed cover, rearing, and resting areas. Optimal percentage of pools range from 35 to 65% of total stream area during the late growing, low-water season for chinook salmon and steelhead (Raleigh et al. 1984, 1986).

Approximately 25% of the total stream area within the Project area consists of pools. Pools found in the Project area are considered fair habitat. Lateral scour pools dominate the type of pools found in Guadalupe Creek. Some of the larger pools are eddy pools caused by the large root masses of mature sycamores. Several of the deeper pools within the Project area are straight scour pools.

Table 3-14. Pool Types and Design Considerations

Pool Type	Channel Location	Process Creating the Pool	Design Consideration	Habitat Notes
Lateral scour pool	Outside curve	Created by flows around curves; scour confined to 60% or less of wetted width	Create with instream structures	Provides feeding and resting stations for adults and juveniles
Straight scour pool	Occurs at gradient break or channel constriction	Created by mid-channel scour; 60% or more of wetted width	Create with IWM complex	Provides feeding and resting stations for adults and juveniles
Backwater eddy pool	Occurs along the stream edge	Formed downstream from large obstructions, such as boulders and logs	Create pool greater than 30 centimeters deep with IWM or boulders	Provides feeding and resting stations for adults and juveniles
Pocket pool	Found in riffles and runs	Formed by medium- to large-size boulder clusters midstream	Create with boulders within the wetted width	Provides feeding and resting stations for adults and juveniles
Alcove pool	Remnant channel or side channel	Formed in blocked or dried remnant outflow channel; maintained by subsurface flow and eddy current	Create at outflow of created flood overflow channels or created side channels	Provides excellent juvenile salmon rearing habitat
Plunge pool	Found across all or part of the channel	Formed by flow over an obstruction such as logs	Should be 1.25 times deeper than jump height where obstruction may block fish passage	Could be juvenile barrier if greater than 0.8 foot in height

3.4.2.4 Riffle/Run Habitat

Riffle habitats are shallow, fast-water areas with turbulent surfaces and runs are fast water areas with smooth surfaces. Riffles and runs are important spawning and food producing areas for adult and juvenile steelhead. The velocity for best food production in riffles and runs is between 1 and 3 feet per second (fps) and the depths between 0.4 and 1 foot. These velocities and depths and a gravel bed size of 1.28 inches create the best conditions for high productivity. (U.S. Army Corps of Engineers 1990). Approximately 5–10 % of the riffle area should be composed predominately of gravels 5–10 cm in diameter that contain less than 15% fine material measuring less than 2 cm in diameter.

The percent of stream area composed of riffles and runs is 60%, and 15%, respectively, in the Guadalupe Creek Project area from Almaden Expressway to Masson Dam. Many of the riffles are too shallow to meet the needs of steelhead and their food organisms.

Steelhead and chinook salmon require water depths of 0.6 and 0.8 foot, respectively, for upstream passage of adults (Thompson 1972). Flows within the Project area during summer are approximately 0.5 cfs at Almaden Expressway. Adult migration may be blocked through several reaches by shallow depth until flows reach between 5 and 7 cfs. During the spawning period of October–April, only 25% of the days had flows high enough to allow fish migration. Analysis of flows and channel morphology indicates that passage conditions and accessability of spawning habitat in Guadalupe Creek will generally be better for adult steelhead rather than for chinook salmon. The majority of adult steelhead are expected to be present in the Guadalupe River from December through April, whereas adult chinook salmon may be present primarily from October through December. (Jones & Stokes 1998.)

3.4.2.5 Spawning Gravel

Substrate size and quality influence salmonid spawning success. For spawning, chinook salmon require substrate from 0.5–10 inches dominated by 1- to 3-inch gravel. Steelhead use gravels from 0.5 to 6 inches dominated by 1- to 3-inch gravel (Raleigh et al. 1984, 1986). Adult chinook salmon and steelhead require relatively clean gravels in which to lay their eggs, generally with less than 15% fines (< 3 mm). Gravels containing a higher proportion of fines (i.e., sand- and silt-sized particles) can affect spawning success by reducing the flow of water and oxygen to the eggs in the gravel, thereby reducing hatching success. Furthermore, fine sediments also can reduce or prevent young salmonids from emerging from gravels after they have hatched.

Substrate is also critical to the production of aquatic insects and survival of juvenile fish. Optimal substrate size and area is based on substrates containing the greatest number of aquatic insects and small juvenile steelhead (Raleigh et al. 1984, 1986). Substrate used as winter cover by rainbow fry and small juveniles ranges from 10–40 cm in diameter. An area of substrate greater than 10% of the total habitat probably provides adequate cover for rainbow fry and small juveniles. The use of smaller substrates as winter cover will increase mortality of young fish due to the shifting of substrates (Dolluff 1994).

Gravel for spawning and rearing habitats within the Project area is considered poor because substrates are generally embedded and shallow; however, a few pockets of good gravels do occur within the Project area. Gravel quality and quantity will be measured prior to restoration activities (U.S. Army Corps of Engineers 2000).

3.4.2.6 Water Temperature

Water temperature is affected by weather, reservoir operations, flow, tributary inflow, groundwater, and physical habitat including shading by riparian vegetation. Water temperature is especially important for chinook salmon and steelhead, which have relatively narrow temperature requirements for carrying out their life history. Table 3-13 presents thermal requirements for life stages of chinook salmon and steelhead based on information from the published literature (Raleigh et al. 1984, 1986). Each life stage of chinook salmon and steelhead has different physiological responses to water temperature conditions. In general, as optimal water temperatures are exceeded, chinook salmon and steelhead can experience increased stress, resulting in greater susceptibility to disease, reduced assimilation efficiency, and increased mortality.

Steelhead rear in streams for up to three years; therefore, summer rearing temperature is a critical time. Optimal rearing temperatures for steelhead range from 54–64 °F, with an upper lethal temperature of 77 °F.

Stream temperature is a limiting factor within the Project area. The lack of canopy cover has resulted in stream temperatures that are suboptimal, especially during summer months. The maximum stream temperature recorded at Almaden Expressway was 87 °F, recorded in July. The maximum water temperature at Masson Dam was 71 °F, recorded in October; 69 °F was the recorded maximum high in July. In Guadalupe Creek, critical limiting water temperature for juvenile steelhead occurs during summer rearing. Summer temperatures in Guadalupe Creek range from 56 to 87 °F at Almaden Expressway and 55 to 71 °F at Masson Dam (water temperature data from the District for 1996 and 1997). Water temperature will continue to be monitored and simulated prior to and after restoration, documenting improvements to water temperature conditions for steelhead (U.S. Army Corps of Engineers 2000).

3.5 LAND USE, INFRASTRUCTURE, AND PUBLIC HEALTH AND SAFETY

3.5.1 Land Use

A variety of land uses occur near or adjacent to the Guadalupe Creek Project area. The creek is currently designated as open space. The majority of the Project area is owned by the District. The creek is surrounded by residential land uses. The majority of the residential areas are separated from the creek by roads, undeveloped parcels, and the Los Capitancillos percolation ponds. The undeveloped properties are described in more detail below. The Le Mirador Senior Apartments border the corner of Coleman Road and Almaden Expressway. The north side of the creek is developed with primarily medium-density residential housing, some very high-density residential apartment complexes, and Pioneer High School. The south side is comprised mostly of medium low-density residential.

Within the Project area, Phase 1 of the Guadalupe Mitigation Project was implemented in 1998. The Phase 1 mitigation site is located along the upper reach (Reach 4) of Guadalupe Creek, downstream from Masson Dam. Planting was implemented along 1,263 linear feet of this site in 1998 to compensate for impacts on SRA cover vegetation resulting from the construction of portions of the Guadalupe River project. The plantings were installed on both sides of the creek, 660 feet downstream from Masson Dam, and continued downstream for approximately 780 feet. Planting sites were located on existing benches and include the following species:

- Trees—*Acer negundo, Aesculus californica, Alnus rhombifolia, Platanus racemosa, Populus fremontii, Quercus douglasii, Quercus lobata, Salix lasiolepis,* and *Salix laevigata* (NOTE: *Quercus* seedlings and acorns were not available during the Phase 1 planting time and will be installed during Phase 2);
- Shrubs—*Baccharis salicifolia, Rosa californica, Salix exigua,* and *Sambucus mexicana*; and
- Herbaceous vegetation—*Artemesia douglasiana.*

Modifications to the creek as part of the Project may affect the Phase 1 plantings. Phase 1 planting areas affected by modifications to the creek will be replaced at a 1:1 ratio.

3.5.1.1 City of San Jose Property

An undeveloped parcel owned by the City of San Jose (Parcel Number 2) is located on the south side of the creek in Reach 2. This reach of the creek is extremely confined by residential development on the north side of the creek and the Meridian Avenue Bridge. An opportunity may exist to obtain an easement from the City of San Jose for this parcel. Securing this parcel would allow for enlargement of the creek's floodplain and ultimate flood capacity. Expansion of the floodplain is consistent with the City of San Jose General Plan (1994), which seeks to balance the need to protect the community from the risk of flood damage with the need to protect San Jose's remaining riparian corridors. In particular, the general plan directs the City of San Jose to cooperate with the District to improve flood protection facilities.

3.5.1.2 Los Capitancillos Freshwater Wetland Mitigation Site

The Los Capitancillos Freshwater Wetland Mitigation Site Development Project is proposed on District-owned property adjacent to the Guadalupe Creek Restoration Project site near Masson Dam. The District is proposing to implement a wetland mitigation project that would include the construction of a seasonal freshwater wetland with an area of as much as 5 acres. The wetland will provide habitat for common seasonal freshwater plants and associated vertebrate and invertebrate species. The District-owned parcel is currently a relatively flat, open, weedy field. The schematic design phase of the project is scheduled to be completed by March 2, 2001. The Engineer's Report and the environmental documents for this project are scheduled to be completed by fall 2001.

The preliminary design concept for the project consists of either a single wetland basin or two interconnected wetland basins. Water will flow into the southwest end of the wetland from the District's Almaden Valley pipeline. The proposed design will also include a berm that will restrict Guadalupe Creek floodflows from entering the Los Capitancillos site. No surface water from the wetland mitigation site will flow into Guadalupe Creek under the existing conceptual plan. Because the site is in a residential area, it is anticipated that the final design will include passive recreational features, such as a pedestrian walkway, wildlife viewing areas, and interpretive signs, as well as vegetation barriers or fences.

Coordination is occurring between the Guadalupe Creek and freshwater wetland projects (both District projects) to ensure that the freshwater wetland will not adversely affect fish. Water use requirements for the freshwater wetland will be reviewed to ensure that water releases into the creek are not reduced and that releases will not increase water temperatures in the creek. The planning and design of the Guadalupe Creek Restoration Project will occur in conjunction with the freshwater wetland. This coordination will create a unified functionality between the two projects and ensure that design features needed for the freshwater wetland, for such things as passive recreational uses, do not conflict with the Guadalupe Creek Restoration Project.

3.5.1.3 Recreational Uses

Unauthorized public access occurs in the Project area. Unauthorized recreational uses along the Project area include jogging, walking, and bicycling along the maintenance access road; fishing in the percolation ponds; and hiking along the creek. Several footpaths (alongside and crossing the creek) are evident in the field and on aerial photographs.

3.5.2 Infrastructure

3.5.2.1 Los Capitancillos Percolation Ponds

The Los Capitancillos percolation pond system begins at Masson Dam, where water is diverted from Guadalupe Creek or the Alamaden Valley pipeline into the gallery box and is treated with a coagulant. The treated water is released into the mixing canal, located south of and adjacent to the first percolation pond. The mixed water enters the first percolation pond, the settling pond, where sediment settles before entering the next pond. The water is transported to and from each pond by a series of pipe connections and low weirs until it reaches the final pond, which is located on the east side of Almaden Expressway near the District office. Water is piped under Meridian Avenue and under the maintenance road west of Meridian Avenue to supply the group of ponds between Meridian Avenue and Almaden Expressway. Pipes are present, in some ponds, to allow diversion of overflow from the ponds into the creek.

3.5.2.2 Flood Control Project

Guadalupe Creek serves as the primary flood conveyance channel for the 15-square- mile Guadalupe Creek drainage basin. In 1973, the Central Flood Control Zone Project 30026 was constructed to increase the flood capacity of Guadalupe Creek. The flood corridor is leveed on its north side along residential development and the Los Capitancillos percolation ponds and bounded on the south side by a natural high terrace. Coleman Road runs along this terrace on the north side of the channel for approximately 7,000 feet in the project area. The flood control project involved increasing the floodplain area by offsetting the previous levee to the north along the percolation ponds and excavating the floodplain to a lower elevation. The height of the constructed levee was increased by the project. District hydraulic model results indicate that the channel has a 100-year peak flood event conveyance capacity. Channel maintenance is performed on a periodic basis to prevent sediment deposits and vegetation from reducing the flood conveyance capacity.

3.5.2.3 Roads and Bridges

The Project area is bounded by three major roadways: Coleman Road, Meridian Avenue, and Almaden Expressway. Coleman Road is adjacent to and south of Guadalupe Creek and carries two lanes of traffic in both directions. Meridian Avenue transects the Project area, crosses the creek, and carries two lanes of traffic in a north/south direction. The eastern edge of Meridian Avenue Bridge is located at cross section 1114 and western edge the bridge is located at cross section 1116. Almaden Expressway is the downstream and eastern boundary of the Project area. Almaden Expressway also crosses the creek and carries three to four lanes (near to and where it crosses the creek) of traffic in a north/south direction. The upstream face of the Almaden Expressway Bridge is located at cross section 1010.

Maintenance access is supplied primarily by the road located on the creek's northern levee. This road is accessible by gates located on Meridian Avenue and Almaden Expressway, where they cross the creek. The levee road runs under the bridges and has several ramps throughout the Project area to allow for vehicular access to the floodplain.

Critical erosion sites that threaten the adjacent roads, including the levee road, are located between cross sections 1220 and 1200 (south side), 1200 and 1190 (north side), 1185 and 1175 (south side), 1165 and 1155 (south side), 1090 and 1085 (south side), and 1045 and 1040 (north side).

A concrete floodwall is located parallel to the creek on the south side between Meridian Avenue and cross section 1105, and approximately between coss sections 1075 and 1045. The existing walls are undercut at the toe in several areas by the creek channel.

3.5.2.4 Other Utilities and Infrastructure

Most utilities within or near the Project area are located near Masson Dam, whose major function is to divert water for the percolation ponds. Three Pacific Gas and Electric (PG&E) electric towers are sited just southeast of the dam. The subsurface Almaden Valley pipeline is located south of the creek, bordering on the edge of a residential community until it crosses under Coleman Road. PG&E also has an underground utility line that runs midway through the field between the creek and Coleman Road and the residential community south of the dam. Other electric utilities are located just outside the Project area and border residential development to the north and south. Pipes carrying runoff from the surrounding development empty into the creek as well as overflow water from the percolation ponds. A siphon crosses the creek under the Meridian Avenue Bridge. A chainlink fence borders Coleman Road for the length of the Project area, except near Almaden Expressway where the fence backs the Le Mirador Senior Apartments.

3.5.3 Public Health and Safety

3.5.3.1 Flood Control

Guadalupe Creek is a potential flooding source for the surrounding community. The District maintains 100-year flood capacity within Guadalupe Creek and maintains limited flood storage capacity in Guadalupe Reservoir by regulating outlet flows. The creek does not pose a significant threat of flooding for 100-year and more frequent flood events. Section 3.2 provides a more detailed description of the frequency of peak flows and the channel capacity.

3.5.3.2 Mosquito and Vector Control

The Santa Clara County Vector Control District (SCCVCD) has jurisdiction over mosquito and other vectors within the Project area and the percolation ponds. Currently, the Project area is not a source of mosquitoes and is not a focus of any control efforts by SCCVCD. Within the percolation ponds, wind action and mosquito fish (stocked by SCCVCD) effectively control mosquitoes. SCCVCD rarely uses chemical control in the percolation ponds (Martini pers. comm.). The SCCVCD expressed interest in reviewing the Project design prior to construction to reduce the likelihood of producing mosquito-breeding habitat.

3.5.3.3 Mercury

Mercury is a widespread problem within the Guadalupe watershed because of historic cinnabar (mercury-bearing ore) mining in the watershed. South San Francisco Bay, Calero Reservoir, Alamitos Creek, Guadalupe Creek, and Guadalupe River, all within the Guadalupe River watershed, have been listed as impaired in the SWRCB's 1998 303(d) list. The New Almaden Mine complex was the largest mine in the area and is located upstream from the Guadalupe Reservoir on lands owned by the Santa Clara County Parks and Recreation Department. Operated intermittently between 1854 and 1976, the Almaden Mine area drains to Los Capitancillos Creek, Almaden Reservoir, Guadalupe Reservoir, Guadalupe Creek, and Alamitos Creek (San Francisco Regional Water Quality Control Board 1998a). Additionally, the Guadalupe Mines that are located immediately upstream from the Project area are at the present location of the Guadalupe Landfill (San Francisco Regional Water Quality Control Board 1998a).

Leaching of tailings and overland flow of mercury rich soils has resulted in the downstream accumulation of mercury in the Guadalupe River watershed. Mercury concentrations in sediments from different sources can vary widely. The mercury content of transported sediment in any location within the watershed will depend primarily on the source and physical properties of the sediment, its organic carbon content, and the fate and transport characteristics of mercury in the water column. Sediment could accumulate behind habitat improvement and structural components, including wetland and riparian vegetation plantings and bank stabilization structures. Methyl mercury could form in these accumulated sediments, a process that is known as methylation. The process of methylation is determined by environmental conditions, such as pH, dissolved organic carbon, temperature, sulfate, and light. Many of these physical and chemical constituents are also affected by biological factors, such as growth, decay, and other metabolic processes. Since most methylation is affected by biological factors, it is likely that methylation processes change seasonally. Projects in the Guadalupe River watershed could potentially contribute to sediment disturbance and transport processes could cause cumulative changes in the locations and rates of methyl mercury formation.

Because of the potential for formation of methyl mercury in the Project area, the District initiated a sampling program to characterize the distribution of mercury in soils and sediments of surfaces that will be modified as part of the Project, and to identify soil disposal considerations (Tetra Tech 2000a). During June and July 2000, 50 sediment samples were collected from the Project site, from the proposed Los Capitancillos freshwater wetland mitigation site located on the south side of the creek adjacent to Coleman Road, and from the upstream creek segment below Camden Avenue. Table 3-15 summarizes the results of preliminary analyses of these samples.

Table 3-15. Results of June–July 2000 Mercury Analyses of Bank Soils at Project Site

Location (depth)	Surface	-6 Inches	-2 Feet	-5 Feet	-10 Feet
Reaches 1–4:					
Number of samples		26	10	2	2
Mean concentration		19 mg/kg	19 mg/kg	24 mg/kg	13 mg/kg
Highest concentration		65 mg/kg	69 mg/kg	24 mg/kg	18 mg/kg
Lowest concentration		3.8 mg/kg	0.72 mg/kg	23 mg/kg	7.6 mg/kg
Los Capitancillos Site:					
Number of samples	6	2	2		
Mean	8.5 mg/kg	6.9 mg/kg	5.7 mg/kg	N/A	N/A
Highest concentration	160 mg/kg	12 mg/kg	9.9 mg/kg		
Lowest concentration	1.1 mg/kg	1.8 mg/kg	1.4 mg/kg		

mg/kg = milligrams per kilogram
N/A = not applicable

An additional ten samples were collected in conjunction with the September 2000 water quality sampling program (six from the Project site and four from upstream localities). Table 3-16 summarizes the results of analyses performed on these samples.

Table 3-16. Results of September 2000 Mercury Analyses of Bank Soils

Parameter	Minimum	Maximum	Mean
Project Reaches			
Total Mercury (mg/kg)	3.0000	27.500	11.783
Upstream Sites			
Total Mercury (mg/kg)	46.700	203.00	100.45

mg/kg = milligrams per kilogram, dry weight

The results of the June–July 2000 analyses demonstrate that mercury concentrations in bank and terrace materials vary widely between sample localities and sampling depths. Sixteen of the 40 sediment samples collected from Reaches 1–4 showed concentrations above 20 mg/kg (the total threshold limit concentration for mercury); concentrations in those samples ranged from 21 to 69 mg/kg. Along Reaches 1–4, there appears to be little to no difference in average mercury concentration between the 6- inch and 2-foot sampling depths. Sparse data collected to date suggest that mean concentrations increase at a depth of 5 feet and then decrease again at a depth of 10 feet; however, only two samples were taken at -5 and -10 feet in Reaches 1–4. One sample from the Los Capitancillos site also exceeded the total threshold limit concentration for mercury, with a concentration of 160 mg/kg. At the Los Capitancillos site, average total mercury concentrations generally decrease with increasing depth.

Results of the September 2000 analyses of bank materials from sites in and upstream from the Project reaches are similar to the June–July results and confirm the variability of mercury content in Guadalupe Creek bank soils. Five of the September samples showed mercury levels in excess of the 20 mg/kg total threshold limit criterion, although only one of these was taken from the Project reach. Moreover, based on the September analyses, mercury concentrations in bank materials appear to be consistently higher than those in instream sediments, although the difference between bank and instream mercury content is greater in the upstream samples (Tetra Tech 2000c).

3.6 CULTURAL RESOURCES

3.6.1 Prehistory and Ethnography

The Santa Clara Valley and surrounding areas are the traditional home of the Ohlone, who are believed to have inhabited the area since about A.D. 500. The territory of the Ohlone extended along the coast from San Francisco Bay in the north to the vicinity of Carmel in the south, and as much as 60 miles inland. Historically, the Ohlone have been called Costanoans, from the Spanish word *costaños*, meaning "people of the coast."

The Ohlone were hunter-gatherers and relied heavily on acorns and various seafoods for subsistence. They also used a wide range of other natural resources for food, shelter, and the production of material goods. These resources included: plant materials, including various seeds, berries, and roots; land and sea mammals; waterfowl; reptiles; and insects. The Ohlone are known to have made a range of lithic and bone tools, as well as balsas (small watercraft constructed of reeds), bows and arrows, cordage, sea otter blankets, and twined basketry. Minerals were used as coloring agents in body paints; hematite and cinnabar yielded red pigment and white was obtained from clay. Like many native Californians, the Ohlone practiced controlled burning to promote the growth of seed-bearing annual plants and increase the available grazing areas for deer, elk, and antelope (Levy 1978).

3.6.2 History

The Guadalupe River system is the focus around which development in the Santa Clara Valley area has prospered. When Spanish explorers traversed the area in 1769 and 1775 in search of appropriate locations for the establishment of presidios, missions, and pueblos, they followed the Guadalupe River through the Santa Clara Valley. Their path became well-traveled and is an important local link in *El Camino Real*, the historic route connecting the missions of Baja and Alta California.

3.6.3 Mining Activities

Deposits of the mercury ore cinnabar approximately 7 miles south of the City were known and used by Native Americans for red pigment. In 1824, the hill containing these deposits was prospected for silver and gold; at this time, it was known as *La Mina Santa Clara*. In 1845, Andres Castillero, intending to develop the mine, filed a claim with the Mexican government. Castillero soon discovered that the mine was a source of mercury ore (Hart 1978). The mine was renamed the New Almaden Mine and became the largest of the mines in the Guadalupe River watershed; the mine site is located on lands that are now part of the 4,000-acre Almaden Quicksilver County Park, owned by the Santa Clara County Parks and Recreation Department. Additional mines in the area included the Guadalupe Mines, located upstream of the Project area. The Guadalupe Mines site is the present location of the Guadalupe landfill.

Mercury, traditionally called quicksilver, is a critical component in the gold smelting process. When the California Gold Rush created an enormous demand for quicksilver, the New Almaden Mine quickly became one of the most famous and productive mercury mines in the world, yielding approximately $1 million annually. The large mine operations required an enormous workforce, which took up residence in small townships around the mine. The New Almaden Mine continued to operate intermittently until the 1970s (Hart 1978).

Chapter 4. Restoration Project Elements

This chapter describes the restoration project elements or design criteria for the Guadalupe Creek Restoration Project. Design criteria have been developed to guide the design and implementation of the Guadalupe Creek Restoration Project. The criteria have been used to formulate alternatives, evaluate alternatives, and select and develop the recommended alternative. Design criteria are grouped by the following topics:

- Geomorphology, Hydrology, and Hydraulics
- Soils and Groundwater
- Vegetation
- Fish Habitat
- Land Use, Infrastructure, and Public Health and Safety
- Civil Engineering

4.1 GEOMORPHOLOGY, HYDROLOGY, AND HYDRAULICS CRITERIA

4.1.1 Topic 1. Channel Stability

Modifications to the creek channel and floodplain should promote long-term channel stability. Channel stability, for the purposes of this discussion, refers to the evolution of a channel that maintains relatively constant average width, depth, and sinuosity over time but does not necessarily imply a static condition at a given point on the stream. Bed stability refers to the absence of a long-term aggradation or degradation trend in the channel, though bed elevations would be expected to vary locally from year to year.

The following text outlines the geomorphic, hydraulic, and sediment- transport characteristics of the Project area and identify considerations necessary to maintain long-term channel stability when creating new planting surfaces and a more complex channel geometry for improved SRA cover vegetation.

4.1.1.1 Subtopic 1A. Channel Form

The existing channel is incised in much of the Project area. The incised channel form results in a narrow main channel subject to high velocities and depths during floods. Bank materials are relatively resistant to erosion and widening of the channel within the terrace surfaces created by the incision. These conditions produce high sediment transport capacities during floods, with the result that little deposition occurs adjacent to the channel or on floodplains in the Project area. However, the main channel should be modified, where feasible, to reduce channel entrenchment and incision. These changes would promote a balance of erosion and deposition at elevations suitable for the establishment of riparian vegetation along the channel.

Modifying the channel and floodplain will involve changes in the width and depth of the main channel and changes in the planform of the creek, such as meander amplitude, wavelength, and radius. These characteristics, collectively referred to here as channel form, have interrelationships in fluvial systems that have been studied extensively. Empirical relations are available in the literature that relate width, depth, and meander characteristics based on measurements from a large number of streams (e.g., Leopold et al. 1964). Considerable variability exists in the data, however, and applying these relations in the design of channel modifications without carefully considering the fluvial processes in play at a particular site can lead to failure.

Design of channel modifications for the Project should therefore also be based on observations from the site, Guadalupe Creek upstream from the site, and streams in similar geomorphic settings in the region. In addition, the hydraulic modeling tools developed for the Project would be used to evaluate proposed designs, including their sediment transport characteristics on a reach and local level.

Action GHH1-1:	*Use a combination of empirical relations, observations from the site and the region, and results of the hydraulic modeling and sediment transport computations to perform initial design of channel and floodplain modifications.*
Action GHH 1-2:	*Use the hydraulic model to evaluate proposed improvements and estimate sediment transport characteristics. Combine hydraulic evaluations with anticipated benefits for SRA cover vegetation and fish habitat to refine the final design.*

4.1.1.2 Subtopic 1B. Floodplain Creation

Considerations that should guide the creation of expanded floodplains for planting surfaces include establishing more uniform sediment transport capacity between reaches, setting elevations of floodplains based on frequency of inundation, and maintaining or improving existing flood capacity. The top of existing channel depositional features in the Project area correspond to discharges from 220 to 360 cfs, based on hydraulic model results and field surveyed cross sections. Return periods for the 220 cfs and 360 cfs flows at SF 43 are 1.5 years and 2 years, respectively. These return periods correlate well with averages cited in the literature for channel forming or effective discharges in alluvial channels (Leopold et al. 1964).

The discharge that inundates the top of channel depositional features at the edge of the floodplain is considered an indicator of the effective discharge. This effective discharge is considered to do the most work over time in moving sediment and forming channel bars and meanders; therefore, it is most closely associated with the morphologic characteristics of the channel (Wolman and Miller 1960, Leopold and Dunne 1978). The effective discharge has been identified as an extremely important indicator for restoration of natural channel form and stability (Rosgen 1996). The hydraulic model developed for the Project and sediment transport computations permit evaluation of stability over a full range of discharges, rather than for a single indicator; however, the discharges corresponding to channel depositional features provide a starting point for estimating appropriate floodplain elevations.

Hydraulic model results show that the current channel and floodplain will convey the 100-year peak discharge. Planting vegetation to create SRA cover vegetation along the Project area will result in higher channel roughness during flood flows, reducing channel capacity. Additional floodplain area will be required to compensate for this higher roughness.

Action GHH1-3: *Where feasible, reduce existing bench and slope elevations to form floodplains corresponding to 1.5- to 2-year floods.* The grading of expanded floodplains at these flood frequencies should focus on reducing the degree of stream entrenchment to values similar to those observed in areas of the Project where vegetated floodplains presently exist and in the stream reach immediately upstream from Masson Dam.

Action GHH 1-4: *Where feasible, reduce bench and slope elevations to significantly increase the flood prone width for 5- to 10-year floods and greater.* This excavation is in addition to the more frequent floodplain creation described above and is primarily for the purpose of reducing velocities and channel scour during extreme events.

Action GHH1-5: *Create additional flood capacity to compensate for increased roughness by lowering the existing benches.*

4.1.1.3 Subtopic 1C. Sediment Transport Capacity

The sediment transport capacity of Reach 1 appears to be close to an equilibrium condition, where the channel is neither aggrading or degrading with time. In contrast, the channel bed in Reaches 2– 4 has degraded since 1972, and these reaches have correspondingly higher sediment transport capacities than Reach 1. In order to reduce the tendency for continued bed degradation and create a more uniform sediment transport capacity through the Project area, the sediment transport capacity should be lowered in Reaches 2–4.

Action GHH1-6: *Reduce sediment transport capacity in Reaches 2–4 by lowering the level of the adjacent floodplain.* This lowering will reduce confinement of flood events and decrease velocities, depths, and shear stresses in the main channel. The associated decrease in sediment transport capacity reduces the potential for streambed degradation. The size and extent of created floodplain surfaces should be designed to produce a more uniform sediment transport capacity through the Project area for 1.5-year and larger floods.

Action GHH1-7: *Construct expanded floodplains or widen the main channel at elevations that promote deposition of fine-grained sediments along the inside of channel bends and on floodplains.* Deposition of fine-grained material provides sites for natural recruitment of riparian vegetation.

Action GHH1-8: *Design the channel to transport sediment at low flows as well as during floods.* Bed and bank features will be constructed to shape the channel and maintain suitable width/depth geometry for sediment transport. Pools will be constructed to be self-scouring, using grade controls, barbs, hardpoints, rootwads, and other IWM.

4.1.1.4 Subtopic 1D. Stabilization Measures

Historically, channel planform in the Project area has been relatively stable since the 1870s. Since 1972, the channel bed has shown historic stability in Reach 1, but degradation has occurred in Reaches 2–4.

Action GHH1-9: *Modify channel form and/or location to promote stability. Use a set of consistent width, depth, and meander dimensions to guide initial design in each geomorphic reach.*

Action GHH1-10: *Widen the main channel and/or expand the floodplain in specific locations within the project area where the present channel is narrow, producing high velocities and shear stresses.* A wider channel reduces localized bank erosion and promotes stability.

Action GHH1-11: *In combination with modification of the channel/floodplain geometry, install grade control features in Reaches 2–4 to stabilize the bed against future channel incision.*

Action GHH1-12: *Maintain channel sinuosity at or near historical levels, approximately 1.10, in order to preserve long-term channel planform stability.* A significant increase in channel sinuosity over historical levels will likely result in greater planform instability resulting from higher rates of bank erosion.

Action GHH1-13: *Construct bank stabilization at erosion sites adjacent to existing infrastructure, such as Coleman Road. Similarly, install bank stabilization on eroding banks where mature trees are undercut and in danger of being lost.* Potential bank stabilization techniques include the use of barbs, buried groins, hardpoints, IWM, toe revetment, and rootwads; construction of bench surfaces; and sloping of the streambanks. All of these techniques may incorporate biotechnical methods to integrate bank stabilization structures and vegetation. A definition of each application is provided at the end of this subsection. The benefits of each application are shown in Table 4-1.

Action GHH1-14: *The adjustment of channel planform should exclude the construction of tight meander bends (e.g., similar to the existing bend at station 47+00) in areas where bank migration is not acceptable.*

4.1.2 Topic 2. Channel Complexity

Efforts to increase channel complexity for fish habitat should focus on the use of localized measures, including grade controls, barbs, buried groins, hardpoints, IWM, toe revetment, and rootwads. These techniques should focus on modifications of hydraulics and channel geometry for relatively low flows, without significantly modifying overall channel sinuosity or slope. Many of these techniques would have secondary benefits to improve channel stability and create improved sites for planting, establishment, and regeneration of riparian vegetation.

Action GHH2-1: *Increase channel complexity in the project area while preserving the existing channel planform as much as possible.* In those cases where relocation of the creek channel is the preferred option, the new channel should exhibit a channel sinuosity near 1.10, similar to the existing channel. Constructed meanders should generally be gradual, with an average wavelength 8–12 times the average width of the main channel.

Action GHH2-2: *Construct pools to be self-scouring, using grade controls, barbs, hardpoints, rootwads, and other IWM.*

4.1.3 Topic 3. Low-Flow Condition

Efforts to establish SRA cover vegetation, increase channel complexity, and improve instream aquatic habitat should focus on modifying channel hydraulics and geometry, including conditions during low-flow periods. The Project will be designed to minimize the width of the low-flow channel using instream structures and slightly increased channel sinuosity. A narrower low-flow channel will decrease water temperature by maintaining deeper flow closer to the bank where it can be shaded by vegetation, and will increase areas with suitable cover and depth for fish during low-flow conditions. The low-flow design condition is established by the management of flows by the District. Masson Dam, located at the immediate upstream end of the Project area, is operated by the District to regulate the diversion of flows from Guadalupe Creek into the Los Capitancillos percolation ponds. Flow diversions to and from the creek below Masson Dam are not gaged; they are estimated on a daily basis by maintenance and operations personal. Flows in the creek below

Table 4-1. Benefits of Floodplain Creation and Increasing Channel Complexity

	Channel Complexity Benefits						
Technique	Creates Pool	Creates Plunge Pool	Narrows Channel Width	Provides Bank Stabilization	Provides Channel Bed Stabilization	Flood plain Creation	Promotes Deposition of Fine Sediments
Instream Techniques							
Grade Control		X			X		
Barbs	X		X	X		O	X
Buried Groins				X		O	
Hardpoints	X			O			
Instream Woody Material	X	O	X	X			X
Toe Revetment			O	X		O	
Rootwad	X		X	X		O	X
Bank Techniques							
Low Bench Surfaces				O	O	X	O
Slope Streambanks				X		X	O
Slope Revetment			O	X		O	
Biotechnical Bank Stabilization			O	X			X

Note:

O = Provides benefits when used in combination with other techniques.
X = Provides benefits when used individually.

Masson Dam are typically regulated to maintain flows, during summer low-flow conditions, of approximately 3–4 cfs at Masson Dam and approximately 0.5 cfs at Almaden Expressway.

Action GHH3-1: *Use the existing managed surface water flow of approximately 3-4 cfs (at Masson Dam) as the design low-flow condition.*

4.2 SOILS AND GROUNDWATER

4.2.1 Topic 1. Depth to the Water Table

The deep water table that occurs under most of the Project area will constrain riparian vegetation establishment and survival. Because the water table loses elevation as it extends laterally from the main channel, the influence of this constraint on riparian vegetation establishment and survival will be more significant as the distance from and elevation above the main channel increases.

Action SG1-1: *Grade land to bring ground surface closer to water table.*

Action SG1-2: *Irrigate the planting zones until the root systems of the riparian vegetation are sufficiently developed to access the water table during the dry season.*

4.2.2 Topic 2. Coarse-Textured Soil and High Coarse Fragment Content

Soils with textures of sandy loam or coarser have relatively low available water holding capacities (AWHC) and, consequently, may not be able to provide sufficient water for the establishment and survival of riparian seedlings. Large quantities of coarse fragments may physically inhibit root growth and, in coarse-textured soils, exacerbate the low AWHC problem.

Action SG2-1: *Irrigate the planting zones until the root systems of the riparian vegetation are sufficiently developed to access the water table during the dry season.*

Action SG2-2: *Incorporate fine-textured materials (i.e., fine-grained soil, gravel, and cobbles from grading operations) into coarse-textured soils that will be planted with riparian vegetation to increase the soil AWHC.*

Action SG2-3: *Excavate planting areas with extremely coarse-textured soils below final grade and backfill with topsoil.*

4.2.3 Topic 3. Hard and Cemented Soil

Soils with hard or cemented subsoil horizons may physically inhibit root growth.

Action SG3-1:	*Loosen the hard and cemented soil before planting riparian vegetation.* Areas within 15' of preservation fencing will be ripped to a 6" depth. Areas where existing soil has a low available water holding capacity will receive topsoil and will be excavated to a 6" depth; after excavation the area will be ripped to a 24" depth. Areas not receiving topsoil will be ripped to a 30" depth.

4.3 VEGETATION

4.3.1 Topic 1. Site Preparation

Existing native and nonnative vegetation is present in the Project area. This vegetation will either be preserved or removed as part of site preparation activities. In addition, before planting operations can begin, surfaces suitable for revegetation will be created during earthwork operations.

Action V1-1:	*Preserve existing native vegetation in the project area.* Native vegetation, including mature sycamores and willows, will be preserved to the extent feasible and protected during construction.
Action V1-2:	*Transplant desired native trees and shrubs from excavation areas.* In areas that will be excavated, existing native plants will be excavated for use as transplants.
Action V1-3:	*Remove invasive nonnative plants.* Existing nonnative plants will be removed (i.e., cleared and grubbed) from the Project area. If necessary, herbicides will be used to remove/control nonnative plants such as cape ivy, star thistle, Himalayan blackberry, and Scotch broom.
Action V1-4:	*Create suitable surfaces for revegetation.* Each plant community will require a different soil condition or distance from groundwater. Some planting areas may require that the existing, compacted soil surface be mechanically ripped. Other planting areas may need the surface excavated to establish its elevation closer to groundwater or the creek surface. In areas with cemented soils, the surfaces may need to be over-excavated and backfilled with topsoil.

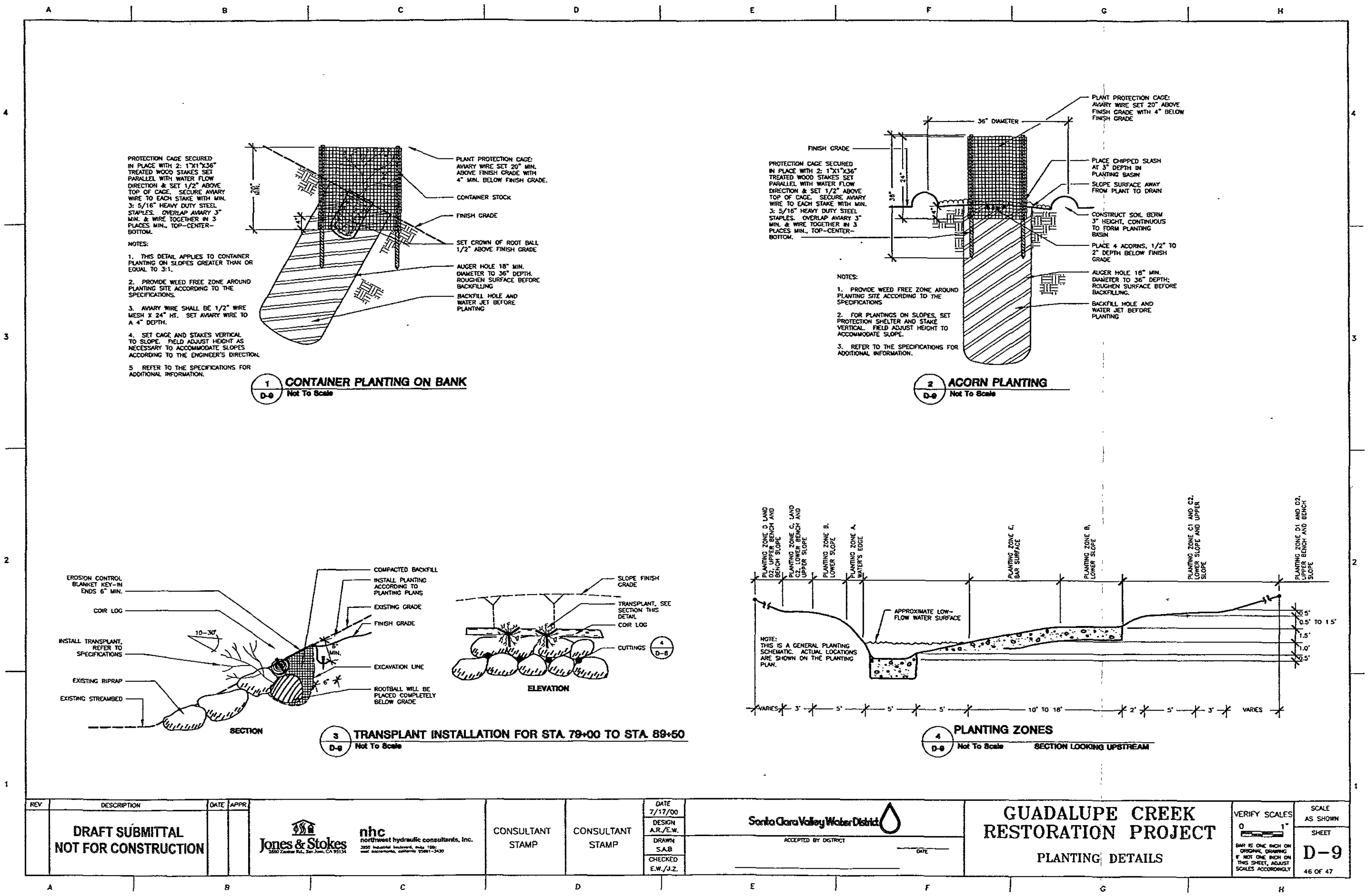
4.3.2 Topic 2. Planting

The intent of planting the Project area is to provide SRA cover vegetation and riparian habitat in the short term and create a self-sustaining vegetation corridor on Guadalupe Creek in the long term. The following subtopics outline the plant species composition, plant collection requirements, and installation techniques for revegetating the Project area.

4.3.2.1 Subtopic 2A. Plant Species Composition

Five planting zones have been developed with an overlap in species to allow plant distributions to occur naturally under diverse microhabitat conditions: water's edge, lower slope, upper slope and lower bench, upper bench, and bar surface. Historic and prehistoric vegetation data and local reference sites were used to develop the plant associations. Plant species composition for each zone is based on site conditions with respect to geomorphic condition, soil conditions, surface water hydrology, flood return interval, and depth to groundwater. In addition, an evaluation of survival, species composition, plant height, and volunteers among the Phase 1 plantings provided insights into plants that appear to thrive at this particular site condition. Figure 4-1 graphically illustrates each zone.

Action V2-1:	*Plant riparian species along the wetted perimeter of the low-flow channel (water's edge zone).* The species composition for this zone white alder, mule far, western sycamore, Fremont's cottonwood, sandbar willow, red willow, and arroyo willow.
Action V2-2:	*Plant riparian species on the lower slope (lower slope zone).* The species composition for this zone consists of white alder, mule far, western sycamore, Fremont's cottonwood, sandbar willow, red willow, and arroyo willow.
Action V2-3:	*Plant riparian species on the upper slope and lower bench (upper slope and lower bench zone).* The species composition for this zone consists of box elder, California buckeye, California sagebrush, mule fat, western sycamore, Fremont's cottonwood, coast live oak, valley oak, California wild rose, arroyo willow, blue elderberry, and California bay.
Action V2-4:	*Plant riparian and oak woodland species on upper bench (upper bench zone).* The species composition for this zone consists of box elder, California buckeye, California sagebrush, coyote brush, coast live oak, blue oak, valley oak, California wild rose, blue elderberry, snowberry, and California bay.
Action V2-5:	*Plant riparian species with IWM on bar surfaces (bar surface zone).* The species composition for this zone consists of white alder, mule fat, western sycamore, Fremont's cottonwood, sandbar willow, red willow, and arroyo willow.


PLANT PROTECTION CAGE: AVIARY WIRE SET 20" MIN. ABOVE FINISH GRADE WITH 4" MIN. BELOW FINISH GRADE.
CONTAINER STOCK
FINISH GRADE
SET CROWN OF ROOT BALL 1/2" ABOVE FINISH GRADE
AUGER HOLE 18" MIN. DIAMETER TO 36" DEPTH. ROUGHEN SURFACE BEFORE BACKFILLING
BACKFILL HOLE AND WATER JET BEFORE PLANTING
20" MIN.
4"

PROTECTION CAGE SECURED IN PLACE WITH 2: 1"X1"X36" TREATED WOOD STAKES SET PARALLEL WITH WATER FLOW DIRECTION & SET 1/2" ABOVE TOP OF CAGE. SECURE AVIARY WIRE TO EACH STAKE WITH MIN. 3: 5/16" HEAVY DUTY STEEL STAPLES. OVERLAP AVIARY 3" MIN. & WIRE TOGETHER IN 3 PLACES MIN., TOP-CENTER-BOTTOM.

NOTES:

1. THIS DETAIL APPLIES TO CONTAINER PLANTING ON SLOPES GREATER THAN OR EQUAL TO 3:1.

2. PROVIDE WEED FREE ZONE AROUND PLANTING SITE ACCORDING TO THE SPECIFICATIONS.

3. AVIARY WIRE SHALL BE 1/2" WIRE MESH X 24" HT. SET AVIARY WIRE TO A 4" DEPTH.

4. SET CAGE AND STAKES VERTICAL TO SLOPE. FIELD ADJUST HEIGHT AS NECESSARY TO ACCOMMODATE SLOPES ACCORDING TO THE ENGINEER'S DIRECTION.

5 REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

1 / D-9 **CONTAINER PLANTING ON BANK**
Not To Scale

36" DIAMETER
FINISH GRADE
24"
36"
4"
PLANT PROTECTION CAGE: AVIARY WIRE SET 20" ABOVE FINISH GRADE WITH 4" BELOW FINISH GRADE
PLACE CHIPPED SLASH AT 3" DEPTH IN PLANTING BASIN
SLOPE SURFACE AWAY FROM PLANT TO DRAIN
CONSTRUCT SOIL BERM 3" HEIGHT, CONTINUOUS TO FORM PLANTING BASIN
PLACE 4 ACORNS, 1/2" TO 2" DEPTH BELOW FINISH GRADE
AUGER HOLE 18" MIN. DIAMETER TO 36" DEPTH; ROUGHEN SURFACE BEFORE BACKFILLING.
BACKFILL HOLE AND WATER JET BEFORE PLANTING

PROTECTION CAGE SECURED IN PLACE WITH 2: 1"X1"X36" TREATED WOOD STAKES SET PARALLEL WITH WATER FLOW DIRECTION & SET 1/2" ABOVE TOP OF CAGE. SECURE AVIARY WIRE TO EACH STAKE WITH MIN. 3: 5/16" HEAVY DUTY STEEL STAPLES. OVERLAP AVIARY 3" MIN. & WIRE TOGETHER IN 3 PLACES MIN., TOP-CENTER-BOTTOM.

NOTES:

1. PROVIDE WEED FREE ZONE AROUND PLANTING SITE ACCORDING TO THE SPECIFICATIONS

2. FOR PLANTINGS ON SLOPES, SET PROTECTION SHELTER AND STAKE VERTICAL. FIELD ADJUST HEIGHT TO ACCOMMODATE SLOPE.

3. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

2 / D-9 **ACORN PLANTING**
Not To Scale

EROSION CONTROL BLANKET KEY-IN ENDS 6" MIN.
COIR LOG
INSTALL TRANSPLANT, REFER TO SPECIFICATIONS
EXISTING RIPRAP
EXISTING STREAMBED
10-30°
COMPACTED BACKFILL
INSTALL PLANTING ACCORDING TO PLANTING PLANS
EXISTING GRADE
FINISH GRADE
6" MIN.
EXCAVATION LINE
6"
ROOTBALL WILL BE PLACED COMPLETELY BELOW GRADE
SECTION
SLOPE FINISH GRADE
TRANSPLANT, SEE SECTION THIS DETAIL
COIR LOG
CUTTINGS 4 / D-8
ELEVATION

3 / D-9 **TRANSPLANT INSTALLATION FOR STA. 79+00 TO STA. 89+50**
Not To Scale

PLANTING ZONE D LAND D2, UPPER BENCH AND BENCH SLOPE
PLANTING ZONE C, LAND C2, LOWER BENCH AND UPPER SLOPE
PLANTING ZONE B, LOWER SLOPE
PLANTING ZONE A, WATER'S EDGE
PLANTING ZONE E, BAR SURFACE
PLANTING ZONE B, LOWER SLOPE
PLANTING ZONE C1 AND C2, LOWER SLOPE AND UPPER SLOPE
PLANTING ZONE D1 AND D2, UPPER BENCH AND BENCH SLOPE
APPROXIMATE LOW-FLOW WATER SURFACE
0.5'
0.5' TO 1.5'
1.5'
1.0'
0.5'
VARIES
3'
5'
5'
5'
10' TO 18'
2'
5'
3'
VARIES

NOTE:
THIS IS A GENERAL PLANTING SCHEMATIC. ACTUAL LOCATIONS ARE SHOWN ON THE PLANTING PLAN.

4 / D-9 **PLANTING ZONES**
Not To Scale SECTION LOOKING UPSTREAM

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

Jones & Stokes
2600 Capitol Ave., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430

CONSULTANT STAMP

CONSULTANT STAMP

DATE 7/17/00
DESIGN A.R./E.W.
DRAWN S.A.B
CHECKED E.W./J.Z.

Santa Clara Valley Water District
ACCEPTED BY DISTRICT
DATE

GUADALUPE CREEK
RESTORATION PROJECT
PLANTING DETAILS

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE AS SHOWN
SHEET D-9
46 OF 47

Figure 4-1
Cross-Section Showing Planting Zones

Action V2-6:	*Emphasize planting within 15 feet of the summer shoreline.* The intent of this zone is to maximize shade.

4.3.2.2 Subtopic 2B. Plant Collection, Propagation, Storage, and Delivery

Circuit Rider Productions has collected some plant propagation materials and the District will be growing the remaining container plants required for the Project. Boxelder, California buckeye, white alder, western sycamore, Fremont's cottonwood, willows, blue oak, valley oak, Live oak, blue elderberry, mugwort, California wild rose, and mule fat have been collected from local sources (i.e., in the Guadalupe River watershed) and are being grown as container stock. The container stock will be delivered to the site once planting operations commence. In addition to these container plants, cuttings and wetland plug species will be collected as part of the construction contract. Additional plant materials would need to be collected, grown, and delivered to the site for subsequent phases of the Project (e.g., future mitigation planting areas).

Action V2-7:	*Collect willow and cottonwood pole cuttings.* Pole cuttings will be collected for installation on appropriate planting surfaces.
Action V2-8:	*Collect plant materials from within the Guadalupe Creek watershed.* To ensure the genetic integrity of the native plant revegetation operations, all plant materials to be used for propagation or direct installation will be collected from within the Guadalupe Creek watershed, unless otherwise approved by the District.
Action V2-9:	*Propagate, store, and deliver plant materials.* For subsequent phases of the Project, collected plant materials will be propagated and stored offsite and delivered to the Project area as seedlings in containers for installation. Plants must not become heat- or water-stressed during storage and delivery operations.

4.3.2.3 Subtopic 2C. Planting Techniques

Action V2-10	*Install live-staked willows at instream features.* On streambanks, willow wattles will be used in conjunction with IWM and bank stabilization features.
Action V2-11	*Install pole cuttings.* Pole cuttings will be installed in the water's edge, lower slope, upper slope and lower bench, and bar surface zones.
Action V2-12	*Install seedlings.* Seedlings will be grown as container stock and will be planted in the native soil. Delivered seedlings must be planted as quickly as possible and stored in shade until planting. All plants will be thoroughly watered at the time of planting.

Action V2-13	*Install transplants.* Native plants excavated during earthwork operations will be transplanted to the appropriate planting zone based on the plant association of the species to be transplanted.

4.3.3 Topic 3. Irrigation

Action V3-1:	*Provide irrigation to newly established plants.* Planting areas will require irrigation during plant establishment. Irrigation will be required for 2–5 years following plant installation.
Action V3-2:	*Provide bubbler irrigation systems to all zones, except for the bar surface zone.*
Action V3-3:	*Provide bubbler irrigation systems within the sycamore/oak woodland plant association.* On the upper terraces, a polyvinylchloride (PVC) pipe, deep watering system will provide appropriate moisture for the plant materials.
Action V3-4:	*Install irrigation system water service points.* Install connections to City of San Jose water mains located near the Project area, as directed by the District, to supply water to the irrigation systems.

4.3.4 Topic 4. Plant Establishment/Maintenance

Action V4-1:	*Water container plants to maintain an adequate supply of moisture within the root zone.*
Action V4-2:	*Control weeds.* Manual, mechanical, and/or chemical (i.e., herbicides) methods will be used to control weeds.
Action V4-3:	*Avoid applying topical fertilizers.* Topical fertilizers encourage vigorous weed growth.
Action V4-4:	*Repair or replace damaged project features.* Damaged Project features (e.g., plants, irrigation system) will be repaired or replaced. Some plant replacement may be required to meet SRA cover vegetation requirements. It is expected that the adaptive management program will recognize any trends that may indicate that the site will not meet the measurable mitigation requirements.

4.3.5 Topic 5. Erosion Control

Action V5-1: *Seed any bare surfaces that have been exposed by construction activities.*

4.4 FISH HABITAT

4.4.1 Topic 1. Overhead Cover

Overhead cover is measured as the percentage of the total stream surface area shaded during midday (Raleigh et al.1984). Overhead cover provides habitat for fish and other aquatic organisms and minimizes potential increases in water temperature. At maturation, trees and shrubs must shade at least 85% of streambank surface and 58% of the total stream surface area under normal summer flow conditions during the hours of 10 a.m. to 2 p.m. (U.S. Army Corps of Engineers 2000). An additional desired habitat condition beyond the MMP is shade covering over pools. The shaded area criteria is consistent with the habitat needs of steelhead and chinook salmon (Raleigh et al. 1984, 1986).

Action F1-1: *Plant fast-growing trees and shrubs within the 15-foot buffer strip of the summer low-flow channel.* Willows, cottonwoods, and alders grow quickly and provide overhead cover. They also have the ability to sprout from roots, live branches, and stems and would reestablish themselves if buried by sediment.

Action F1-2: *Grade banks adjacent to incised channel to increase floodplain area.* Created floodplain area provides additional riparian planting areas to increase overhead cover.

Action F1-3: *Install structures, such as rootwads, boulders, large wood material, and wood/boulder complexes, in the summer low-flow channel.* Structures narrow the low-flow channel and direct flow adjacent to shaded banks, increasing the percentage of shaded stream surface.

Action F1-4: *Install structures, such as rootwads, boulders, large wood material, and wood/boulder complexes, on floodplain surfaces, including exposed bars, to protect vegetation during plant establishment.* Structures on bars and in the floodplain provide sites where trees and shrubs can root and grow. Large stable pieces of wood protect established riparian plants. Bars and other floodplain features may become stable with establishment of riparian vegetation. The plant roots and stems slow velocity, causing fine sediments and organic materials to settle and improving the site for maintaining plant communities (Sedell et al. 1988).

Action F1-5: *Plant higher terrace and upland tree and shrub species to provide shade.* Higher terrace and upland trees and shrubs species are slower growing, yet provide dense long-term shade once they mature.

4.4.2 Topic 2. Instream Cover

Instream cover is an important component of fish habitat. Steelhead abundance is directly correlated with the amount of instream cover (Raleigh et al.1984). Instream cover includes undercut banks with an undercut width greater than 10 cm; roots, logs, and debris piles greater than 1000 cm^2 in surface area; and boulders and rocks greater than 20 cm in diameter. Fry prefer shallow habitat with depths less than 1 foot and velocity less than 1 foot per second (Raleigh et al.1984), generally along stream margins or in backwater pool habitat. Few fry are found greater than 1 meter from instream cover. As fish grow, habitat with higher velocity and increased depth is used, but juveniles remain associated with instream cover.

Instream cover within the mitigated reaches must exceed 10% of the total stream area at depths greater then 15cm. The 10% instream cover criterion must be met within 10 years of project implementation (U.S. Army Corps of Engineers 2000). Other desirable fish habitat improvements include cover of at least 15–25% of the total stream area for juvenile and older steelhead (Raleigh et al.1984).

Action F2-1: *Plant fast-growing trees and shrubs within the 15-foot buffer strip of the summer low-flow channel.* Vegetation increases potential for future recruitment of IWM through production and entrapment of woody debris. Riparian planting will provide future IWM within 30 years. (Swanson and Lienkaemper 1982).

Action F2-2: *Grade banks adjacent to incised channel to increase floodplain area.* Increased floodplain reduces midchannel velocity and associated bank and channel erosion during high-flow events, retaining habitat in stream cover provided by vegetation and structure along and within the low-flow channel.

Action F2-3: *Install structures, such as rootwads, large wood material, and wood/boulder complexes, along banks of the summer low-flow channel.* Structures create undercut banks, provide resting areas during high flows, improve feeding areas, and provide refuge from predators.

Action F2-4: *Install structures, such as rootwads, boulders, large wood material, and wood/boulder complexes, on floodplain surfaces, including exposed bars, to protect vegetation during plant establishment.* Structures on bars and in the floodplain provide resting areas during high flows and contribute cover to the stream channel.

Action F2-5: *Install fine woody material in conjunction with structures in the summer low-flow channel.* Fine woody material in shallow pool margin areas provide cover for steelhead and chinook salmon fry and juveniles (Raleigh et al.1984).

4.4.3 Topic 3. Pool Habitat

The Guadalupe Restoration Project would move toward desired pool habitat conditions. The optimal percentage of pool area for steelhead and chinook salmon ranges from 35 to 65% of total stream area during low-flow periods (Raleigh et al. 1984, 1986). For Guadalupe Creek, a distance of 100–180 feet, or 4–6 times the bankfull stream width, is suggested between pools. Pools differ in the amount and quality of escape cover, winter cover, and resting areas that they provide. Desirable stream habitat for steelhead and chinook salmon would have more than 20% of the pools where the pool bottom is obscured by surface turbulence or structures such as logs, debris piles, boulders, or overhanging banks and vegetation. Pools do not have to be channel spanning. Backwater pools formed by eddies and pocket pools formed behind boulders and wood in riffles provide refuge, feeding, and resting areas for adult and juvenile fish.

Action F3-1: *Plant fast-growing trees and shrubs within the 15-foot buffer strip of the summer low-flow channel.* Vegetation increases potential for future recruitment of IWM through production and entrapment of woody debris. Woody debris causes scour and formation of pool habitat, maintaining pool abundance and diversity. Vegetation also provides instream and overhead cover in adjacent pools, improving fish habitat quality.

Action F3-2: *Install structures, such as rootwads, large wood material, and wood/boulder complexes, in the summer low-flow channel.* Numbers of pools are positively correlated with numbers of debris pieces in low gradient streams (Dulloff 1994). Structures also provide cover in pools, improving habitat quality.

Action F3-3: *Install structures, such as rootwads, boulders, large wood material, and wood/boulder complexes, on floodplain surfaces, including exposed bars, to protect vegetation during plant establishment.* Structures on bars and in the floodplain capture woody debris that would cause scour and formation of pool habitat, maintaining pool abundance and diversity.

4.4.4 Topic 4. Riffle/Run Habitat

Actions to improve riffle/run habitat conditions for steelhead and chinook salmon should create a more defined thalweg, reduce embeddedness of substrates. Restoring these features will improve anadromous fish spawning habitat, increase depth to improve passage conditions, and increase habitat diversity within riffle reaches. In addition, restoration actions would enhance food production in riffles, moving existing conditions toward velocities between 1 and 3 feet per second, depths between 0.4 and 1 foot, and gravel sizes greater than 1.28 inches (U.S. Army Corps of Engineers 2000).

Action F4-1: *Plant fast-growing trees and shrubs within the 15-foot buffer strip of the summer low-flow channel.* Vegetation stabilizes banks and low floodplains, narrowing the channel and increasing water depth and velocity. Narrow channels increase overall water depth and locally increase water velocity within riffles, improving fish passage and food production conditions.

Action F4-2: *Install structures, such as rootwads, large wood material, and wood/boulder complexes in the summer low-flow channel.* Structures would be used to manipulate channel geomorphology and maintain a narrower low-flow channel.

Action F4-3: *Grade banks adjacent to incised channel to increase floodplain area.* Increased floodplain reduces midchannel velocity and associated bank and channel erosion during high flows, retaining the low-flow channel integrity relative to width and depth.

4.4.5 Topic 5. Water Temperature

As mitigation for the Guadalupe River Project, the MMP measurable objective for thermal suitability indicator for anadromous fish habitat requires that total monthly thermal suitability units for steelhead and chinook salmon life stages under postproject conditions equal or exceed preproject thermal suitability units within 40 years of project construction. Calculation of thermal suitability units includes the Guadalupe River Project area as well as Guadalupe Creek and Reach A. The difference between preproject thermal suitability units and postproject thermal suitability units must indicate a decreasing trend by the tenth year (U.S. Army Corps of Engineers 2000). Stream temperature would be reduced by increasing shade/canopy coverage over the stream, increasing average depth, decreasing average width, and increasing average flows.

Action F5-1: *Plant fast-growing trees and shrubs within the 15-foot buffer strip of the summer low-flow channel.* Trees and shrubs near the summer low-flow channel will begin to provide shade and cool water temperature sooner than trees and shrubs set back from the channel.

Action F5-2: *Grade banks adjacent to incised channel to increase floodplain area.* Created floodplain area provides additional riparian planting areas to increase overhead cover and the resulting shade.

Action F5-3: *Install structures, such as rootwads, boulders, large wood material, and wood/boulder complexes, in the summer low-flow channel.* Structures narrow the channel and direct flow adjacent to shaded banks, increasing the percentage of shaded stream surface. The narrower channel also increases depth, reducing maximum daily water temperatures.

Action F5-4: *Install structures, such as rootwads, boulders, large wood material, and wood/boulder complexes, on floodplain surfaces, including exposed bars, to protect vegetation during plant establishment.* Structures on bars and in the floodplain provide sites where trees and shrubs can root and grow. Increased vegetated banks would provide additional shaded stream surface.

Action F5-5: *Plant higher terrace and upland tree and shrub species to provide shade.* Higher terrace and upland trees and shrubs species are slower growing, yet provide dense long-term shade once they mature.

4.5 LAND USE, INFRASTRUCTURE, AND PUBLIC HEALTH AND SAFETY

4.5.1 Topic 1. Land Use

Action LU1-1 *Obtain flood easement or purchase parcel from the City of San Jose.* Securing this parcel would allow for the enlargement of the creek's floodplain and ultimate flood capacity.

Action LU1-2 *Coordinate between the Guadalupe Creek Restoration Project and the Los Capitancillos Freshwater Wetland Mitigation Project to ensure that a unified functionality is created between the two projects.*

4.5.2 Topic 2. Existing Facilities

Action LU2-1: *Identify facilities to be protected and accurately locate these facilities during final design.* Facilities that will be identified include percolation pond and water management system improvements, flood control project improvements, roads and bridges, and underground utilities.

Action LU2-2: *Protect or relocate existing drainage outfall structures, percolation pond piping, and percolation pond levees.*

Action LU2-3: *Construct bank protection in areas where the creek presently threatens Coleman Road using engineering criteria for long-term performance in* *preventing erosion and bank migration.* While these methods may still incorporate biotechnical methods, these areas will be designed to a higher standard of erosion prevention and longer service life than other areas of the Project.

Action LU2-4: *Provide a planted buffer, where possible, between roads and the creek.*

Action LU2-4: *Demolish existing infrastructure in excavation areas.* Existing structures, such as concrete slope protection, will be removed in the floodplain expansion areas.

4.5.3 Topic 3. Public Health and Safety

4.5.3.1 Subtopic 3A. Flood Control

Guadalupe Creek serves as the primary flood conveyance channel for the Guadalupe Creek drainage basin.

Action LU3-1: *Maintain or improve existing flood capacity.* Modifications may be required to compensate for increased roughness due to vegetation.

4.5.3.2 Subtopic 3B. Mosquito and Vector Control

Action LU3-2: *Review the final design of the creek with the Santa Clara County vector Control District (SCCVCD) to ensure the design does not increase mosquitos and other vectors in the project area.*

4.5.3.3 Subtopic 3C. Toxic Constituents – Mercury

During construction of the Guadalupe Creek Restoration Project, a Soil Management Plan will be implemented to minimize discharges of mercury-laden sediments during construction activities.

Action LU3-3: *Sample material grubbed, scraped, and excavated from the channel bed and banks for total mercury concentration at a rate of one sample for every 2,500 cubic yards of material removed.*

Action LU3-4: *Prohibit the reuse of material (i.e., material grubbed, scraped, and excavated from the channel bed and banks) onsite in active channel areas (below the 3-year recurrence interval) unless it can be demonstrated to contain less than 1 milligram/kilogram total mercury.* If soil is to be disposed of offsite, the material will be hauled to an accepting location or facility from which it would not be transported back to the Guadalupe River system or into San Francisco Bay.

Action LU3-5: *Dispose of soil contaminated by mercury based on sampling results.* Soil with greater than 20 milligrams/kilogram will be handled and disposed of as hazardous material.

Action LU3-6: *Minimize the potential for the formation of deep (greater than 4 feet) pools to minimize the potential for methyl mercury formation.*

Action LU3-7: *Minimize the amount of wetland vegetation (emergent and aquatic species) to minimize the potential for methyl mercury formation.* Plant woody species to provide shade to discourage wetland vegetation growth.

4.6 CIVIL ENGINEERING

4.6.1 Topic 1. Design Standards

The Project includes grading and channel stabilization work designed to meet the MMP measurable mitigation objectives for improved SRA cover vegetation and fish habitat. In addition, the District has identified an objective to restore physical and ecological functions in the Project area. Traditional engineering design standards are generally based on static performance criteria (i.e., bank protection would be considered successful if no additional bank erosion occurs after the Project is constructed). In contrast, an emphasis on process restoration implies a more dynamic performance standard. In addition, rather than a defined service life, the Project should be designed to evolve towards a condition of equilibrium that limits required maintenance.

The Project will include installation of IWM and other channel and bank features that will be constructed of wood. Normal fluvial processes would transport these materials at very slow rates. The postconstruction management activities associated with these process will be identified in the design process.

Action CE1-1: *Design the project to evolve over time, recognizing that bank erosion and deposition are normal fluvial processes.* Designs for installed channel features should not necessarily attempt to create static conditions, unless required to protect infrastructure.

Action CE1-2: *Identify management activities associated with anticipated changes in the project area due to fluvial processes.* Design the Project such that management activities are eventually similar to those used by the District for natural streams with higher levels of riparian vegetation and instream wood.

4.6.2 Topic 2. Construction Planning

Action CE2-1: *Consider environmental regulations, potential construction impacts, and weather for construction sequencing and phasing.* It will be necessary to ensure that adequate stockpile and staging areas are available to provide operational flexibility for the contractor in meeting schedules and phasing various elements of the work.

4.6.3 Topic 3. Traffic Control and Access to Work

Access to the Project site will be required for construction equipment, contractor's employee vehicles, and delivery and removal of construction materials. A large amount of excavated soil will require export and disposal offsite, which will require traffic and dust control provisions.

Action CE3-1: *Prepare a traffic control plan to prevent traffic conflicts and damage to existing public roads.* A traffic control plan, prepared by the selected contractor, will be incorporated into the plans and specifications for the Project.

Action CE3-2: *Identify suitable sites, if available, for disposal of excavated material.* District needs for soil materials on other projects will be considered.

Action CE3-3: *Limit truck access to the site, if extensive material delivery or export is required, to Almaden Expressway to avoid traffic conflicts on Meridian Avenue.* Other vehicles will be allowed to enter and exit the site from the southbound lane of Almaden Expressway, to exit from the maintenance road gate on the east side of the Meridian Avenue Bridge, and to enter the site from the levee gate on the west side of Meridian Avenue Bridge. Construction traffic will be prevented from entering adjacent residential neighborhoods.

Action CE3-4: *Designate limited access routes to the creek to avoid impacts to existing vegetation, SRA cover vegetation, and aquatic habitat.* If required, creek crossing locations and temporary facilities necessary to protect the channel during construction will be designated.

Action CE3-5: *Prepare a dewatering plan for the creek to allow work to be accomplished in the dry.* Water diversion with the District will coordinated to maintain flows in the creek upstream from Masson Dam. Where necessary, equipment will be moved along the bed of the stream for access to the work without damaging bank vegetation. Creek bed in areas used for access will be restored.

4.6.4 Topic 4. Earthwork

Action CE4-1: *Import material that is suitable for use as topsoil within the project.*

Action CE4-2: *Use onsite material (if feasible) and/or import cobble and gravel material for use in constructing relocated portions of the channel.*

Action CE4-3: *Overexcavate floodplains where required for replacement of a topsoil layer; overexcavate created channel bed where necessary to provide allowance for scour in bed materials.*

Action CE4-4: *Use slopes of 3 horizontal to 1 vertical (3:1) or flatter wherever possible in grading associated with expanding the floodplain.* Where necessary to avoid impacts to existing vegetation, biotechnically stabilized slopes will be used at no steeper than 1.5:1. Slopes for constructed bar surfaces will be used that match observed bar morphology in the Project area and in the stream reach upstream from Masson Dam. Channel banks on the outside of bends will be allowed to remain vertical or nearly vertical, but slope height will be reduced based on geomorphic and hydraulic criteria for expanding the floodplain.

Action CE4-5: *Consider potential methods for constructing undercut banks, including excavation in resistant bank materials, installation of structures at the toe of the bank, and construction of a resistant undercut toe using cemented native materials.*

Action CE4-6: *Minimize cuts into existing slopes for installation of bank structures, especially on slopes adjacent to Coleman Road or other infrastructure.*

Action CE4-7: *Design bank and channel stabilization and fish habitat features to provide areas for replacement of existing coarse-textured, compacted, or cemented soils with soils more suitable for planting.*

Action CE4-8: *Salvage soils excavated onsite that have concentrations of total mercury (less than 20 miligrams/kilogram) for use as levee fill or in other areas outside of the active channel (5-year floodplain).*

4.6.5 Topic 5. Temporary Erosion Control

Action CE5-1: *Prepare a Stormwater Pollution Prevention Plan for approval by the Regional Water Quality Control Board and indicate required temporary erosion control measures in the plans and specifications.*

Action CE5-2: *Identify contingency and remedial erosion control measures in the event that unanticipated delays occur in the construction schedule or minor erosion problems occur during or immediately after construction.*

4.6.6 Topic 6. Stream Diversion

Construction activities performed in the channel will require stream diversion. Diversion of the entire stream through the percolation ponds is feasible using existing District water management facilities. This diversion would allow the creek upstream from Masson Dam to continue to flow at low levels (e.g., 5 cfs) during construction. The stream diversion will affect District water management operations during the construction period. In addition, the Project includes modifications to the existing percolation ponds or other water management facilities; temporary facilities will be required to allow stream diversion through the percolation pond system.

Action CE6-1: *Dewater the creek during instream construction by diverting flows from Guadalupe Creek into the percolation ponds at Masson Dam.* Prior to diversion, fish and other animals will be removed from the creek and relocated. Dewatering will occur gradually to allow monitoring of the creek during this period for removal of remaining fish and animals.

Action CE6-2: *Identify methods for rewatering the creek following construction to minimize transport of fine sediments downstream.* Potential methods might include installing temporary gravel dams in the channel, pumping to temporary detention ponds, or pumping to provide controlled irrigation of floodplain surfaces. Suitable methods will depend to some extent on construction phasing and anticipated weather and reservoir operations.

Chapter 5. Project Alternatives and Recommended Project

This chapter describes alternatives for establishing riparian and SRA cover vegetation and improving aquatic habitat in the Guadalupe Creek Restoration Project area, including the recommended project. Descriptions of each alternative including proposed restoration elements, earthwork, and estimated costs are provided below on a reach by reach basis. An overview of the reach locations is shown in Figure 5-1. A draft submittal plan set (July 17, 2000) for the recommended project is provided in Appendix C. Two additional plan view illustrations (Sheets 6-16 and 6-17 of Appendix C) are provided for Reach 4; these sheets depict revisions to the grading plans for the Los Capitancillos Wetland Mitigation Development Site (Sheets 6-12, 6-13 and 6-14) and the maintenance road levee adjacent to percolation pond 1 (Sheet 6-12). These revisions are based on comments received from District staff on the draft submittal plan set.

5.1 ALTERNATIVES CONSIDERED

Alternatives for the Guadalupe Creek Restoration Project were developed based on an extensive and thorough screening process. During the planning phase of the Project, project objectives were developed to guide the alternatives development process and to screen out possible alternatives that were infeasible or would not result in the implementation of a viable, self-sustaining project. The formulation, evaluation, and selection of practicable alternatives were based on an assessment of (1) their ability to meet stated Project objectives; (2) potential long-term environmental, economic, and social impacts; and (3) issues and concerns raised during the scoping process by various resource and regulatory agencies and other interested parties and individuals.

5.1.1 Alternative 1: Channel and Floodplain Modification Alternative

The Channel and Floodplain Modification Alternative (Alternative 1) emphasizes modifying channel and floodplain surfaces by channel relocation, floodplain development, and bank stabilization to enhance instream habitat and create conditions suitable for the establishment and long-term viability of SRA vegetation. Under Alternative 1, floodplain excavation would extend beyond the 15-foot planting zone (relative to the low-flow channel) to compensate for reduction in flood conveyance capacity associated with planting riparian vegetation. Implementation of this alternative would involve shifting approximately 2,500 lf of existing stream channel, excavating and removing approximately 42,000 cubic yards of material and importing approximately 13,000 cubic yards of material to create suitable planting sites. In addition, approximately 725 lf bank protection features would be installed, and approximately 6 acres of riparian vegetation and approximately

13,000 lf of SRA cover vegetation would be established under Alternative 1. Specific project features associated with this alternative are described below on a reach-specific basis. Plan view illustrations for each reach and a typical cross-section is shown on Figures 5-2, 5-3, 5-4, 5-5 and 5-6.

5.1.1.1 Reach 1

In Reach 1, Alternative 1 will emphasize planting existing surfaces, including bars, and minimizing physical modifications to the channel and floodplain. However, portions of the existing channel will be shifted to create new floodplain surfaces for planting along Coleman Road and to protect the maintenance road levee from further erosion.

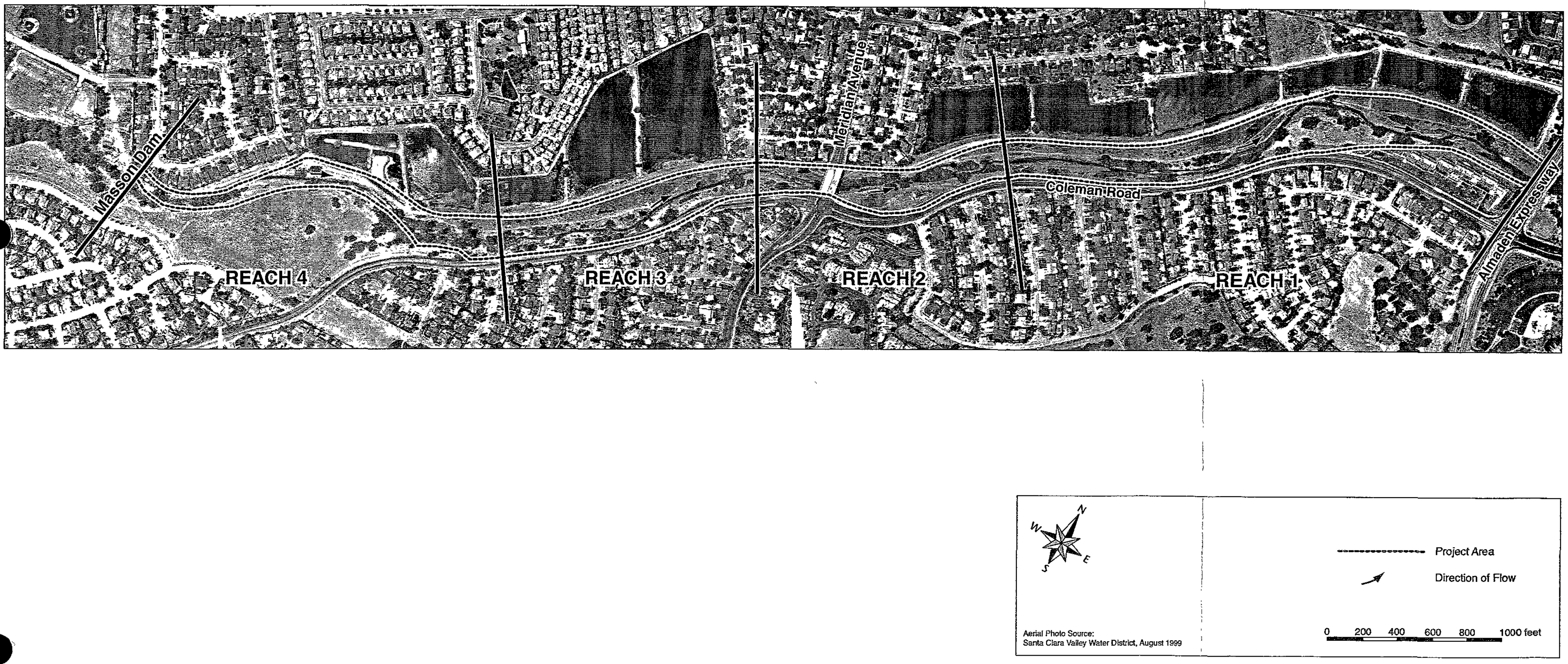
Instream structures (e.g., rootwads and other IWM, stream barbs, boulders, and v-weirs) will be incorporated into the channel bed and banks to control existing erosion, narrow the low-flow channel, provide cover and instream habitat for fish, and improve hydraulic diversity while maintaining the low sinuosity of the existing planform. Rootwads, barbs, and similar features will also be used to stabilize the bench along Coleman Road and to provide instream cover for fish.

The planting program for Reach 1 will emphasize planting sycamores and other riparian vegetation on floodplain and bar surfaces to create a strip of riparian vegetation along the north bank, and to fill gaps in the existing riparian canopy. The bench at the toe of the slope along Coleman Road will also be planted with riparian species. Oak woodland species will be planted at relatively low elevations where soils are coarse and permeable and contain less moisture. Immediately upstream from the Almaden Expressway Bridge, planting areas will be tapered to ensure that the bridge opening is unobstructed, and existing access to the bridge will be maintained to facilitate maintenance activities.

5.1.1.2 Reach 2

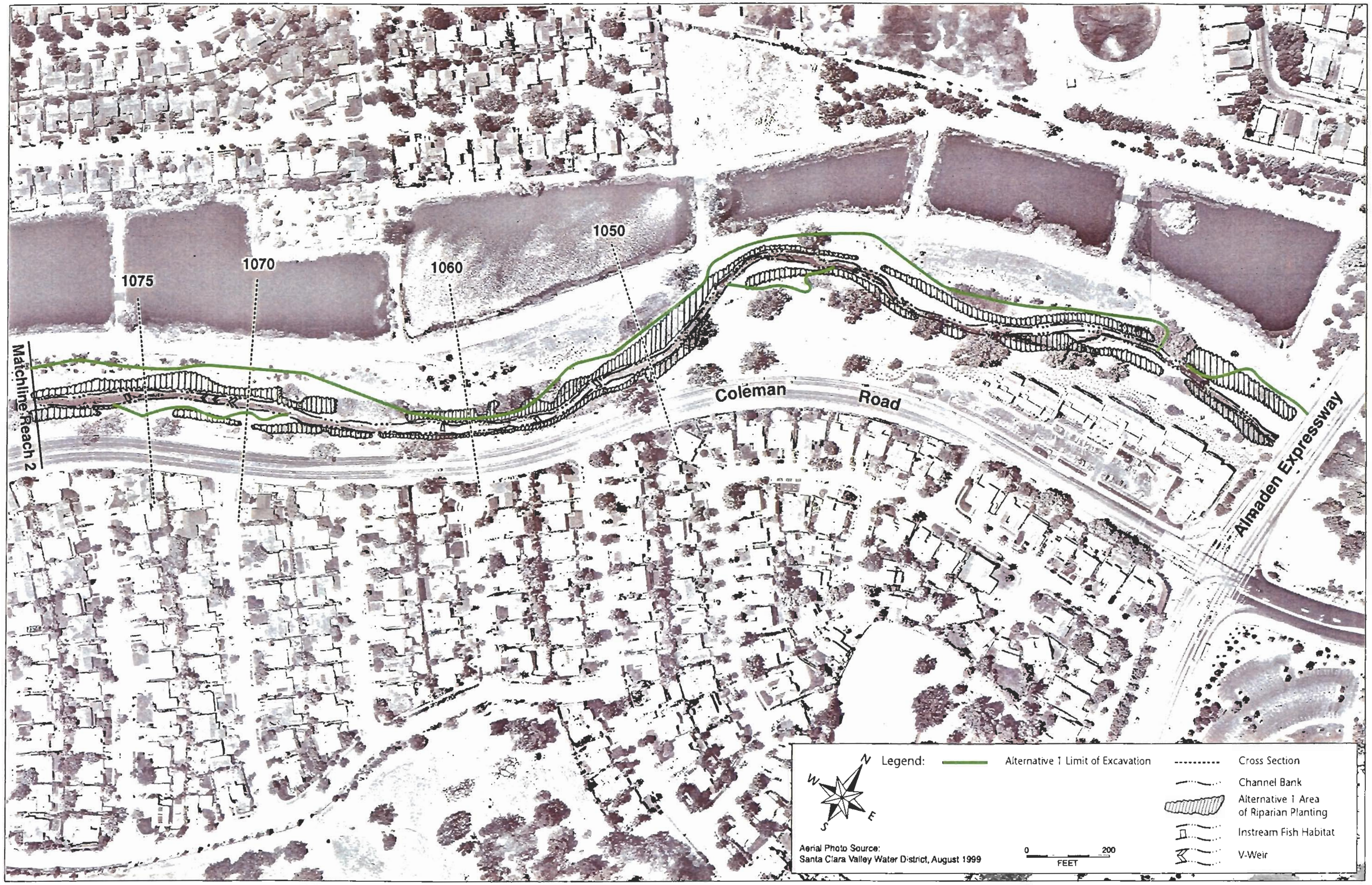
The existing planform of the creek will generally be maintained in Reach 2. Minor modifications will be made to lower floodplains in most areas, except downstream from the Meridian Avenue Bridge, where more extensive excavation will expand the floodplain on the parcel owned by the City. This expansion will reduce the flow velocity in the main channel while preserving a band of willows along the south bank. An existing sycamore tree at the top of the bank will be removed to allow for the expansion of the floodplain. An existing oak in the same area may also be removed.

Instream structures will also be installed in Reach 2. IWM will be used to improve bank stability, to increase instream cover, and to increase channel complexity and hydraulic diversity in the low-flow channel. Bank stabilization structures will be used on the bend upstream from Meridian Avenue to protect the maintenance road and improve instream cover. Near the downstream end of Reach 2, bank stabilization measures will be installed at the toe of the bank adjacent to Coleman Road.



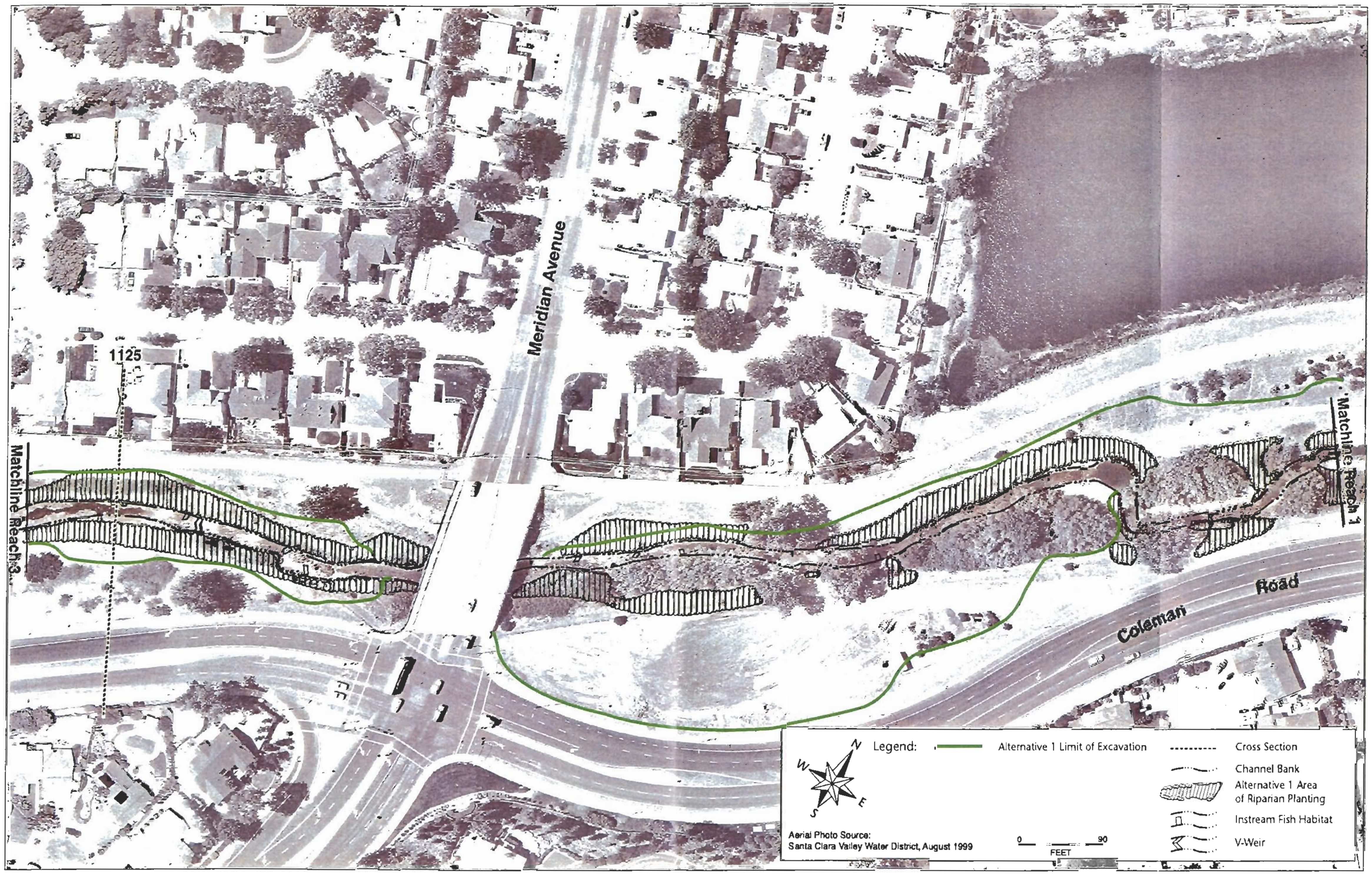
Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 5-1
Delineation of Geomorphic Reaches in Guadalupe Creek Project Area



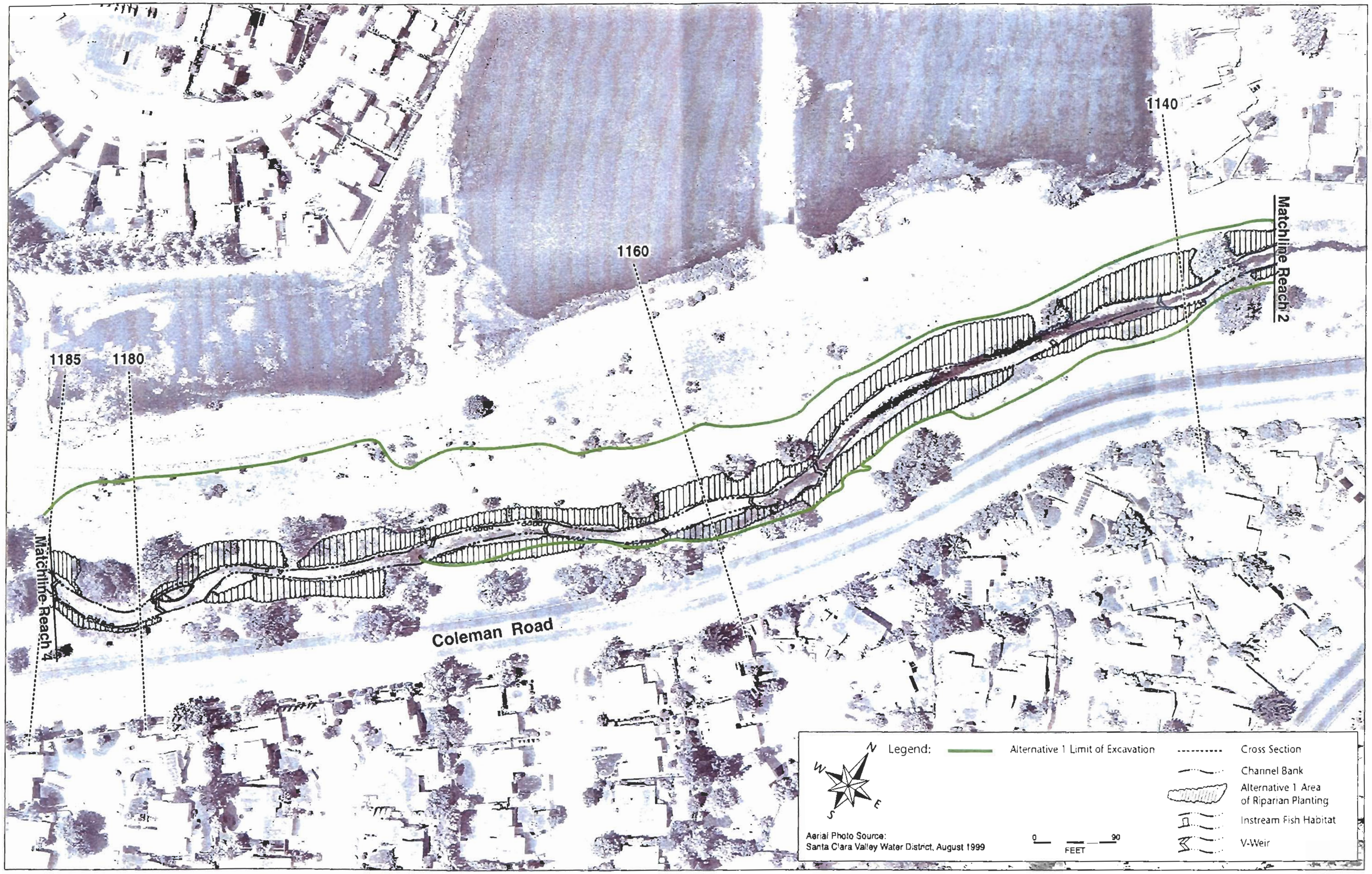
Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 5-2
Alternative 1 - Reach 1



Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 5-3
Alternative 1 - Reach 2



Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 5-4
Alternative 1 - Reach 3

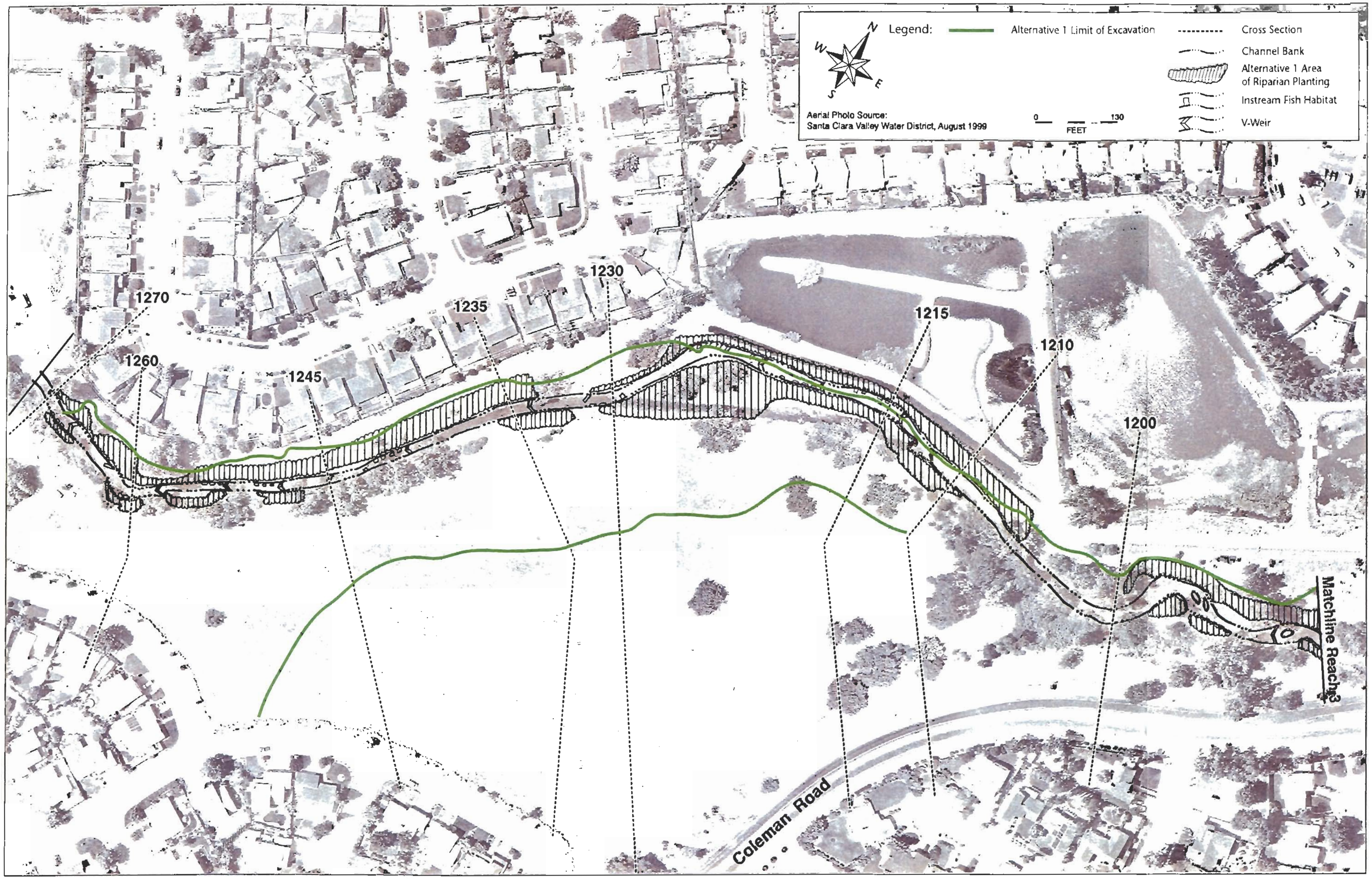


Figure 5-5
Alternative 1 - Reach 4

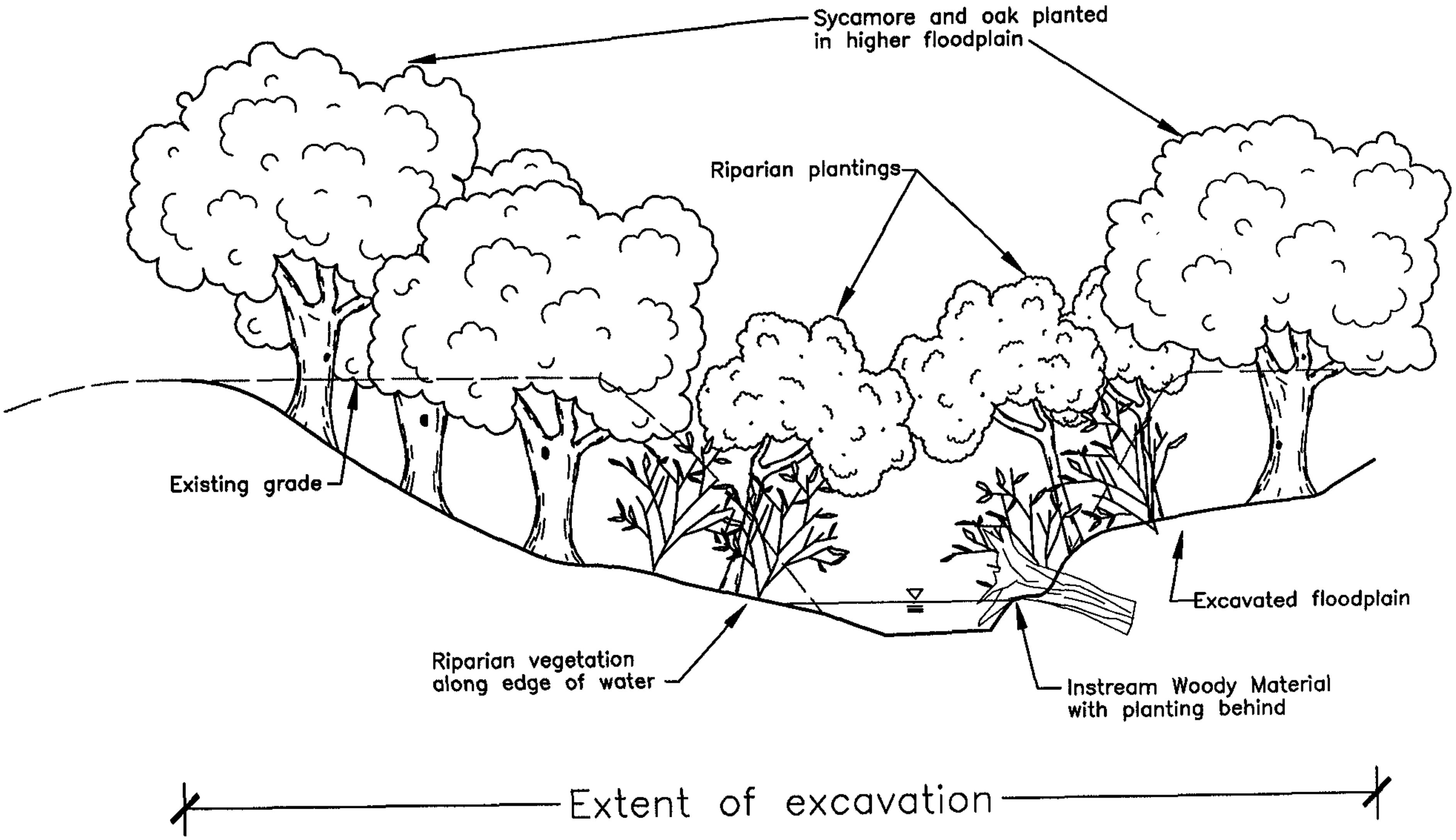

Sycamore and oak planted in higher floodplain
Riparian plantings
Existing grade
Excavated floodplain
Riparian vegetation along edge of water
Instream Woody Material with planting behind
Extent of excavation

Figure 5-6
Alternative 1 - Typical Cross Section

Planting in Reach 2 will include establishing riparian vegetation on the lower floodplain surfaces and higher slopes and terraces. Immediately upstream and downstream from the Meridian Avenue Bridge, the planting areas will be tapered to ensure that the bridge opening is unobstructed. Sycamore woodland species will be planted on the north side of the creek immediately upstream from the bridge to ensure that the plantings do not impede floodflows.

5.1.1.3 Reach 3

Project features proposed for Reach 3 will focus on modifying the existing channel and floodplain to reduce the level of entrenchment, providing planting surfaces for riparian vegetation, and increasing hydraulic diversity in the channel. Near the downstream end of the reach, modifications will be made to the channel planform to extend the floodplain and increase channel complexity and hydraulic diversity. These modifications will generally follow the same meander pattern that now exists in the upstream portion of the reach. Channel realignment will significantly expand the area suitable for planting riparian vegetation. Two mature sycamores, located on artificially created mounds and isolated from the active floodplain, will be removed to create additional floodplain surfaces to reduce channel velocities. IWM will be added to stabilize the bed and banks, to increase cover, and to increase channel complexity and hydraulic diversity. Woody material will also be placed on the bar surfaces in Reach 3 to stabilize the bars and provide additional planting sites.

The planting program in this reach will focus on planting riparian vegetation on expanded floodplain surfaces, in areas where the channel has been relocated, and on sites created by the installation of bank structures and placement of IWM on the backs of bars. Oak woodland species will be planted on the higher surfaces to fill gaps between existing vegetation.

5.1.1.4 Reach 4

In the downstream segment of the reach, significant SRA cover vegetation already exists and fish habitat values are high. Minimal modifications will be made to the channel in this portion of Reach 4. Woody material will be placed in an existing erosion cusp to protect the maintenance road, shelter young riparian vegetation, and provide additional planting sites.

Downstream from Percolation Pond 1, which serves as a settling basin for the percolation pond system, approximately 350 feet of the existing maintenance road will be shifted to the north to create a wider bench adjacent to the channel. This shift will increase flood conveyance capacity and provide a buffer to protect the road from bank erosion.

In the area adjacent to Percolation Pond 1, the channel will be relocated north to reoccupy a historical channel alignment. Two existing sycamores may be affected by the channel alignment. Approximately 600 feet of new channel will be created. This realignment will require relocating the maintenance road approximately 10 feet to the north, and filling the existing channel to create a new floodplain. Percolation Pond 1 will not be modified. These actions will lengthen the channel and increase instream cover and channel complexity. The channel alignment will use existing mature trees to shade the new stream surface. Existing Phase 1 plantings affected by the channel realignment will be transplanted in appropriate areas.

In the upstream segment of Reach 4, the floodplain will be expanded. On the south side of the channel, a broad lowered floodplain surface will be graded along the stream at the edge of the Los Capitancillos Freshwater Wetland Mitigation Site. On the north side of the channel, the width of the maintenance road will be reduced to 25 feet to create a floodplain bench. In addition, some of the existing riprap along the north bank will be removed.

The planting program in Reach 4 will focus on planting riparian vegetation and oak woodland species on created surfaces. Along the south bank of the creek, existing riparian vegetation upstream will be preserved. Additional project features that will be implemented in Reach 4 include installing IWM to provide planting sites on bar surfaces and installing rootwads and other structures to stabilize the outside banks of meander bends and to create instream cover.

5.1.1.5 Cost

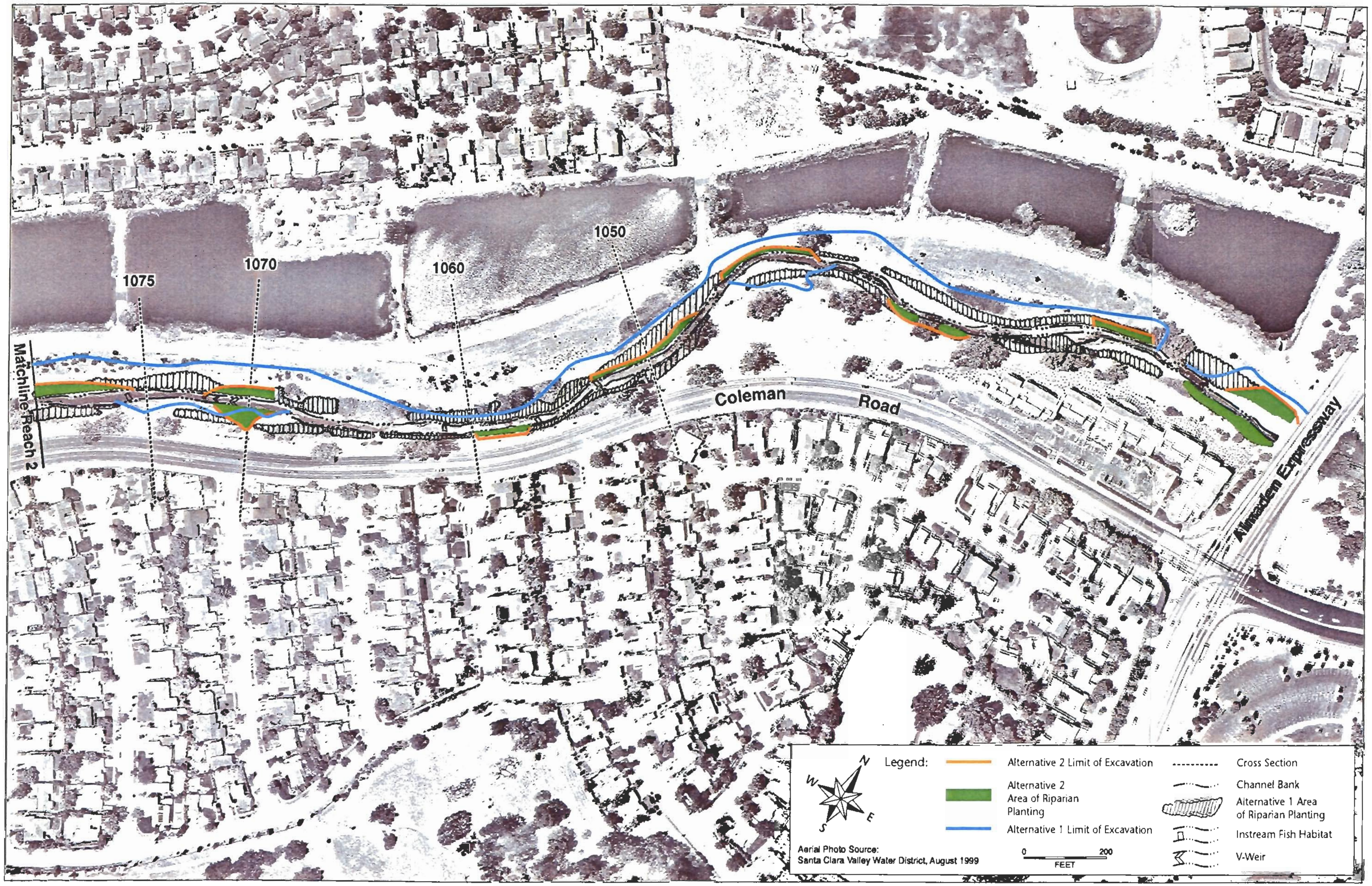
The estimated cost of Alternative 1 is $8,492,550. A detailed breakdown of costs associated with this alternative is provided in Chapter 7 and Appendix D.

5.1.2 Alternative 2: Reduced Channel and Floodplain Modification

The Reduced Channel and Floodplain Modification Alternative (Alternative 2) would incorporate many of the restoration features specified for Alternative 1. However, under Alternative 2 excavation would focus on the 15-foot zone adjacent to the low-flow channel and the number of proposed channel shifts would be reduced relative to Alternative 1. Planting densities would also be reduced to compensate for reduced flood conveyance capacity. Implementation of this alternative would involve shifting approximately 1,200 lf of existing stream channel, excavating and removing approximately 31,000 cubic yards of material and importing 11,500 cubic yards of material to create suitable planting sites. In addition, approximately 1.095 lf bank protection features would be installed, and approximately 4 acres of riparian vegetation and 9,500 lf of SRA cover vegetation would be established under Alternative 2. Specific project features associated with this alternative are described below on a reach-specific basis. Plan view illustrations for each reach and a typical cross section is shown on Figures 5-7 through 5-11.

5.1.2.1 Reach 1

In Reach 1, Alternative 2 will emphasize planting existing surfaces within the 15-foot zone adjacent to the low-flow channel, and minimizing physical modifications to the channel and floodplain. However, portions of the existing channel will be shifted to create new floodplain


1075
1070
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Matchline Reach 2
Coleman Road
Almaden Expressway
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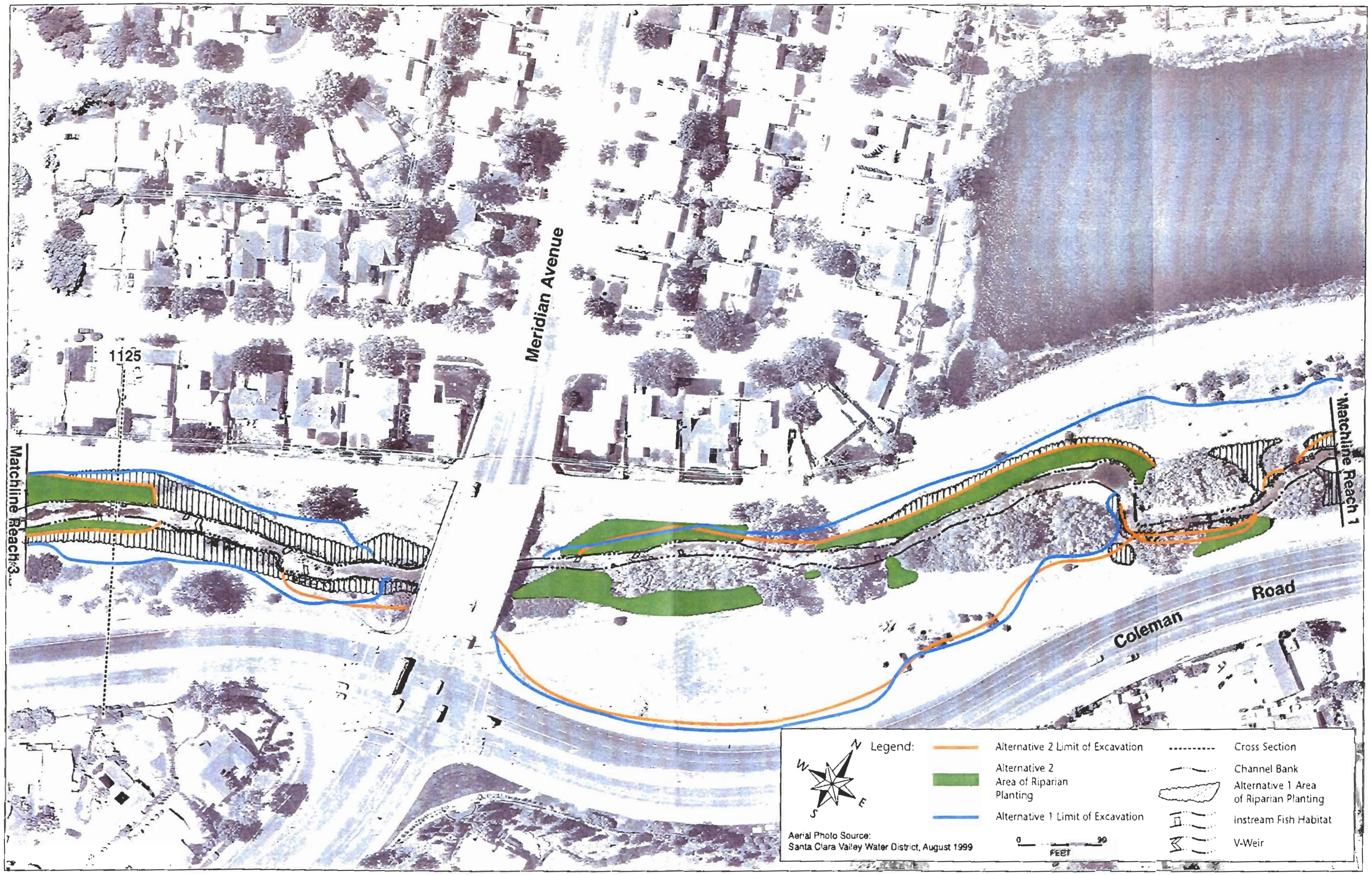
Legend:
Alternative 2 Limit of Excavation
Alternative 2 Area of Riparian Planting
Alternative 1 Limit of Excavation
Cross Section
Channel Bank
Alternative 1 Area of Riparian Planting
Instream Fish Habitat
V-Weir
Aerial Photo Source: Santa Clara Valley Water District, August 1999
0
200
FEET

Figure 5-7
Alternative 2 - Reach 1


Meridian Avenue
1125
Matchline Reach 3
Matchline Reach 1
Coleman Road
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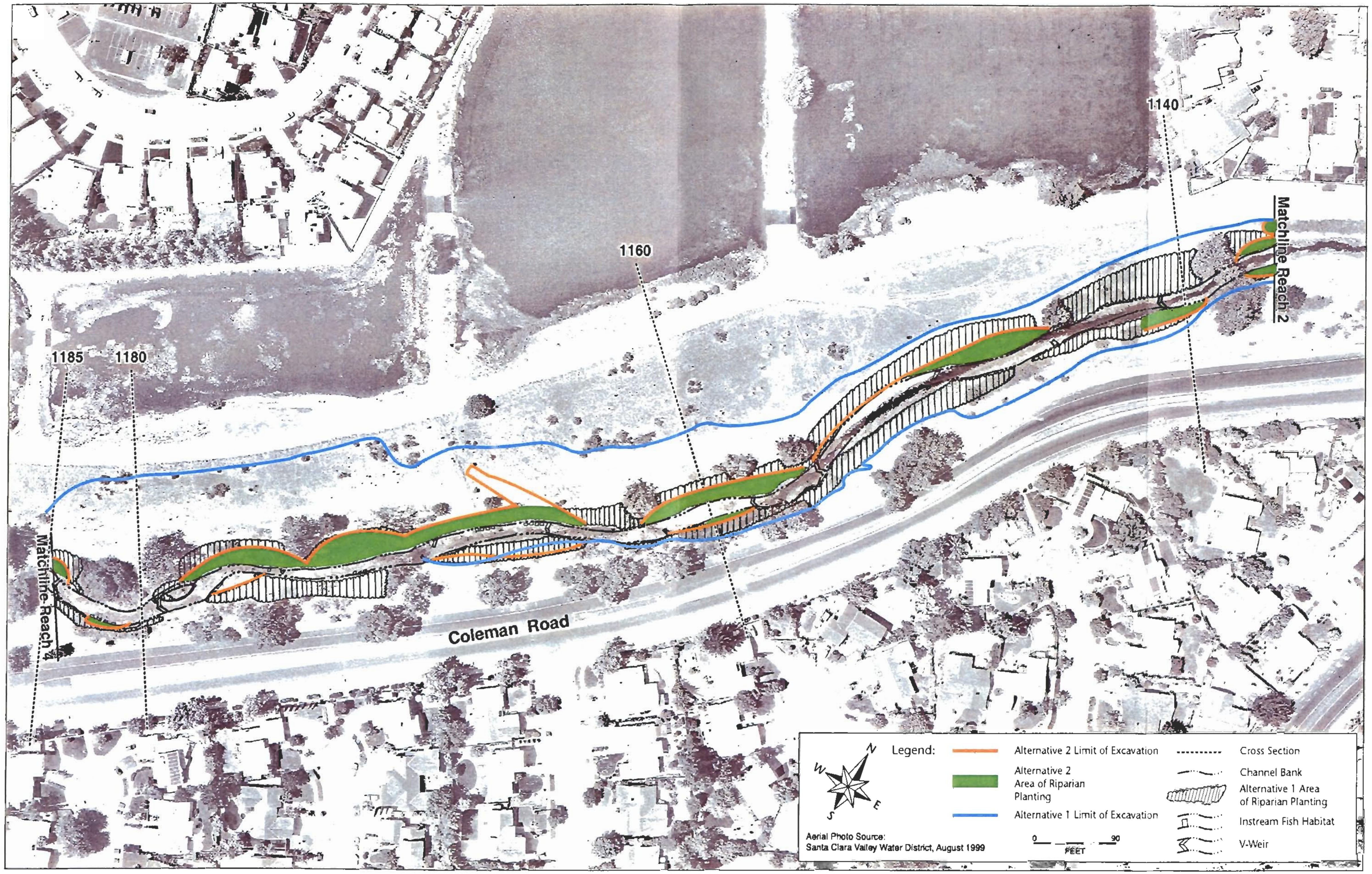
Legend:
Alternative 2 Limit of Excavation
Alternative 2 Area of Riparian Planting
Alternative 1 Limit of Excavation
Cross Section
Channel Bank
Alternative 1 Area of Riparian Planting
Instream Fish Habitat
V-Weir
0
90
FEET

Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 5-8
Alternative 2 - Reach 2


1140
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Matchline Reach 2
Matchline Reach 4
Coleman Road
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Legend:
Alternative 2 Limit of Excavation
Alternative 2 Area of Riparian Planting
Alternative 1 Limit of Excavation
Cross Section
Channel Bank
Alternative 1 Area of Riparian Planting
Instream Fish Habitat
V-Weir
Aerial Photo Source:
Santa Clara Valley Water District, August 1999
0
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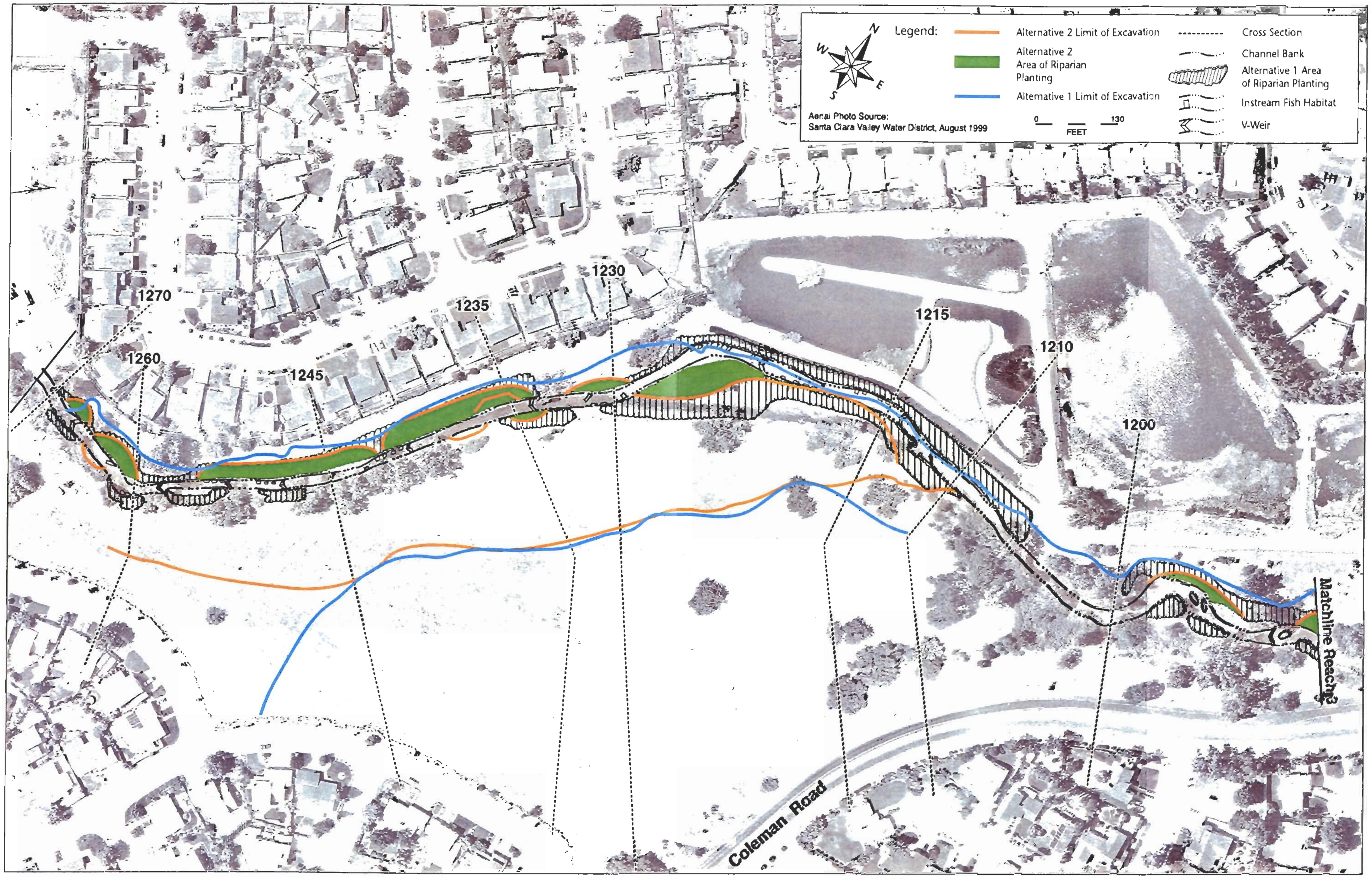
FEET

Figure 5-9
Alternative 2 - Reach 3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Legend:
Alternative 2 Limit of Excavation
Alternative 2 Area of Riparian Planting
Alternative 1 Limit of Excavation
Cross Section
Channel Bank
Alternative 1 Area of Riparian Planting
Instream Fish Habitat
V-Weir
Aerial Photo Source:
Santa Clara Valley Water District, August 1999
0
130
FEET
1270
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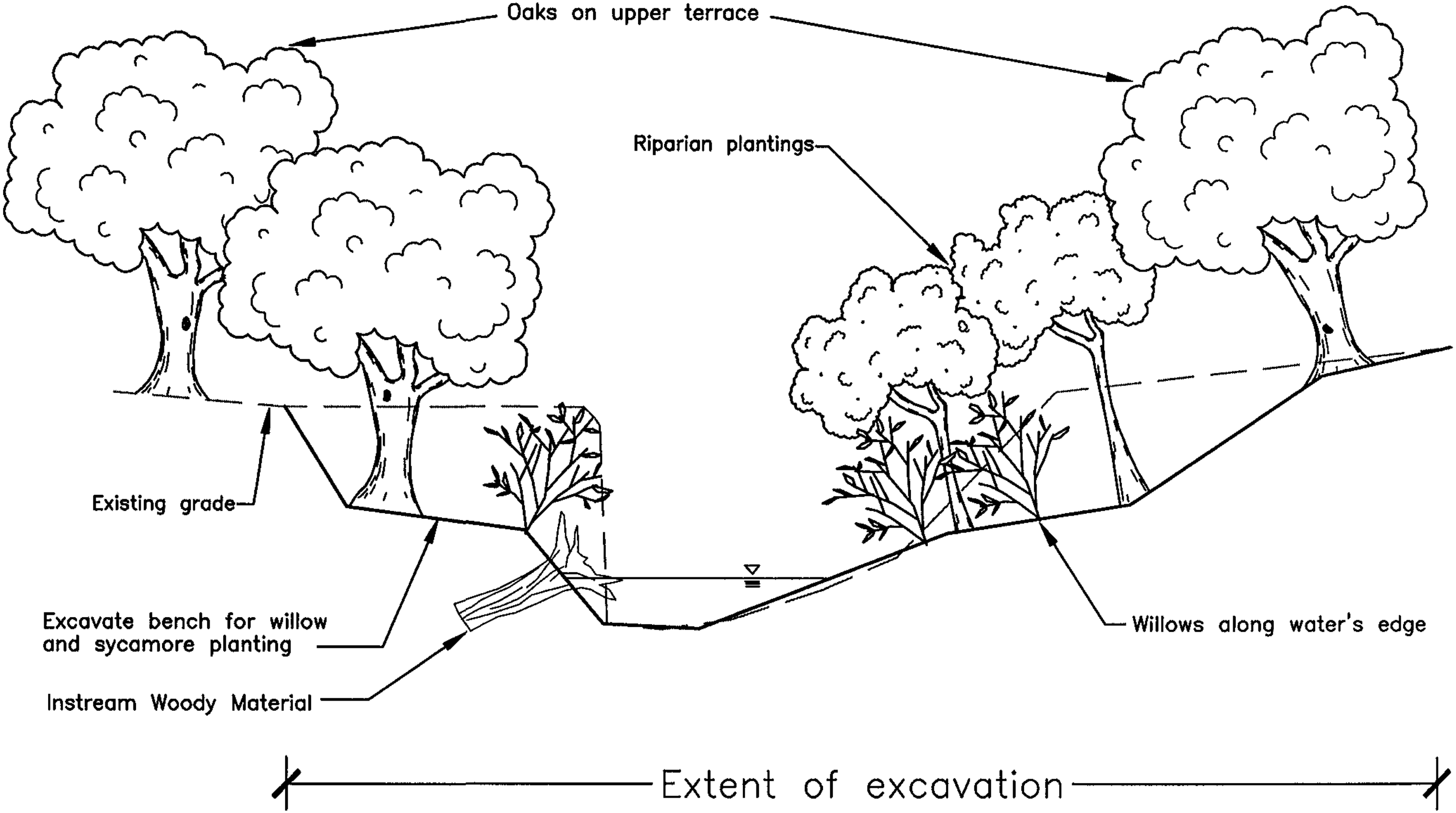
1245
1235
1230
1215
1210
1200
Coleman Road
Matchline Reach 3

Figure 5-10
Alternative 2 - Reach 4



Jones & Stokes

Figure 5-11
Alternative 2 - Typical Cross Section

surfaces for planting along Coleman Road and to protect the maintenance road levee from further erosion.

Instream structures (e.g., rootwads and other IWM, stream barbs, boulders, and v-weirs) will be incorporated into the channel bed and banks to control existing erosion, narrow the low-flow channel, provide cover and instream habitat for fish, and improve hydraulic diversity while maintaining the low sinuosity of the existing planform. Rootwads, barbs, and similar features will also be used to stabilize the bench along Coleman Road and to provide instream cover for fish.

The planting program for Reach 1 will emphasize planting sycamores and other riparian vegetation on existing bar surfaces and existing and created floodplain surfaces to create a strip of riparian vegetation along the north channel bank, and to fill gaps in the existing riparian canopy. The bench at the toe of the slope along Coleman Road will also be planted with riparian species. Oak woodland species will be planted at relatively low elevations where soils are coarse and permeable and contain less moisture. Immediately upstream from the Almaden Expressway Bridge, planting areas will be tapered to ensure that the bridge opening is unobstructed, and existing access to the bridge will be maintained to facilitate maintenance activities.

5.1.2.2 Reach 2

The existing planform of the creek will generally be maintained in Reach 2. Minor modifications will be made to lower floodplains in most areas, except downstream from the Meridian Avenue Bridge, where more extensive excavation will expand the floodplain on the parcel owned by the City. This expansion will reduce the flow velocity in the main channel while preserving a band of willows along the south bank. An existing sycamore tree at the top of the bank will be removed to allow for the expansion of the floodplain. An existing oak in the same area may also be removed.

Instream structures will also be installed in Reach 2. IWM will be used to improve bank stability, to increase instream cover, and to increase channel complexity and hydraulic diversity in the low-flow channel. Bank stabilization structures will be used on the bend upstream from Meridian Avenue to protect the maintenance road and improve instream cover. Near the downstream end of Reach 2, bank stabilization measures will be installed at the toe of the bank adjacent to Coleman Road.

Planting in Reach 2 will focus on establishing riparian vegetation on the lower floodplain surfaces within the 15-foot zone adjacent to the low-flow channel. Immediately upstream and downstream from the Meridian Avenue Bridge, the planting areas will be tapered to ensure that the bridge opening is unobstructed. Sycamore woodland species will be planted on the north side of the creek immediately upstream from the bridge to ensure that the plantings do not impede floodflows.

5.1.2.3 Reach 3

Project features proposed for Reach 3 will focus on creating planting surfaces for riparian vegetation, and increasing hydraulic diversity in the channel. IWM will be added to stabilize the bed and banks, to increase cover, and to increase channel complexity and hydraulic diversity. Woody material will also be placed on the bar surfaces in Reach 3 to stabilize the bars and provide additional planting sites.

The planting program in this reach will focus on planting riparian vegetation within the 15-foot zone adjacent to the low-flow channel, and on sites created by the installation of bank structures and placement of IWM on the backs of bars. Oak woodland species will be planted on the higher surfaces to fill gaps between existing vegetation.

5.1.2.4 Reach 4

In the downstream segment of the reach, significant SRA cover vegetation already exists and fish habitat values are high. Under Alternative 2, only minor modifications will be made to the channel in this portion of Reach 4. Woody material will be placed in an existing erosion cusp to protect the maintenance road, shelter young riparian vegetation, and provide additional planting sites.

Downstream from Percolation Pond 1, which serves as a settling basin for the percolation pond system, approximately 350 feet of the existing maintenance road will be shifted to the north to create a wider bench adjacent to the channel. This shift will increase flood conveyance capacity and provide a buffer to protect the road from bank erosion.

In the area adjacent to Percolation Pond 1, the channel will be relocated north to reoccupy a historical channel alignment. Two existing sycamores may be affected by the channel alignment. Approximately 600 feet of new channel will be created. This realignment will require relocating the maintenance road approximately 10 feet to the north, and filling the existing channel to create a new floodplain. Percolation Pond 1 will not be modified. These actions will lengthen the channel and increase instream cover and channel complexity. The channel alignment will use existing mature trees to shade the new stream surface. Existing Phase 1 plantings affected by the channel realignment will be transplanted in appropriate areas.

In the upstream segment of Reach 4, the floodplain will be expanded. On the south side of the channel, a broad lowered floodplain surface will be graded along the stream at the edge of the Los Capitancillos Freshwater Wetland Mitigation Site. On the north side of the channel, the width of the maintenance road will be reduced to 25 feet to create a floodplain bench. In addition, some of the existing riprap along the north bank will be removed.

The planting program in Reach 4 will focus on planting riparian vegetation and oak woodland species on created surfaces. Along the south bank of the creek, existing riparian vegetation upstream will be preserved. Additional project features that will be implemented in Reach 4 include installing

IWM to provide planting sites on bar surfaces and installing rootwads and other structures to stabilize the outside banks of meander bends and to create instream cover.

5.1.2.5 Cost

The estimated cost of Alternative 2 is $6,819,010. A detailed breakdown of costs associated with this alternative is provided in Appendix D.

5.1.3 Alternative 3: Minimal Channel and Floodplain Modification Alternative

The Minimal Channel and Floodplain Modification Alternative (Alternative 3) would incorporate many of the restoration features specified for the Alternative 1. However, under Alternative 3, the amount of bank excavation would be substantially reduced and would focus only on key areas within the 15-foot zone adjacent to the low-flow channel. Only one channel planform shift would occur (Reach 4) under Alternative 3. Planting densities throughout the Project site would be reduced to compensate for reduced flood conveyance capacity, and planting in Reach 4 would be limited to in-fill planting within existing stands of riparian vegetation. The number of bank and bed stabilization structures installed under Alternative 3 would be substantially increased to reduce the potential for channel incision and bank erosion. Implementation of this alternative would involve shifting approximately 300 lf of existing stream channel, excavating and removing approximately 11,500 cubic yards of material and importing 7,000 cubic yards of material to create suitable planting sites. In addition, approximately 1,285 lf bank protection features would be installed, and approximately 2.3 acres of riparian vegetation and 6,800 lf of SRA cover vegetation would be established under Alternative 3. Specific project features associated with this alternative are described below on a reach-specific basis. Plan view illustrations for each reach and a typical cross section is shown on Figures 5-12 through 5-16.

5.1.3.1 Reach 1

Under Alternative 3, the planting program for Reach 1 will emphasize planting sycamores and other riparian vegetation on existing floodplain and bar surfaces to create a strip of riparian vegetation along the north bank, and to fill gaps in the existing riparian canopy. The bench at the toe of the slope along Coleman Road will also be planted with riparian species. Oak woodland species will be planted at relatively low elevations where soils are coarse and permeable and contain less moisture. Immediately upstream from the Almaden Expressway Bridge, planting areas will be tapered to ensure that the bridge opening is unobstructed, and existing access to the bridge will be maintained to facilitate maintenance activities.

Instream structures (e.g., rootwads and other IWM, stream barbs, boulders, and v-weirs) will be incorporated into the channel bed and banks to control existing erosion, narrow the low-flow channel, provide cover and instream habitat for fish, and improve hydraulic diversity. Rootwads, barbs, and similar features will also be used to stabilize the bench along Coleman Road and to provide instream cover for fish.

5.1.3.2 Reach 2

The existing planform of the creek will be maintained in Reach 2 and only minor modifications will be made to lower floodplains in most areas. Instream structures will be installed to improve bank stability, to increase instream cover, and to increase channel complexity and hydraulic diversity in the low-flow channel. Bank stabilization structures will be used on the bend upstream from Meridian Avenue to protect the maintenance road and improve instream cover. Near the downstream end of Reach 2, bank stabilization measures will be installed at the toe of the bank adjacent to Coleman Road.

Planting in Reach 2 will focus on establishing riparian vegetation on the lower floodplain surfaces within the 15-foot zone adjacent to the low-flow channel. Immediately upstream and downstream from the Meridian Avenue Bridge, the planting areas will be tapered to ensure that the bridge opening is unobstructed. Sycamore woodland species will be planted on the north side of the creek immediately upstream from the bridge to ensure that the plantings do not impede floodflows.

5.1.3.3 Reach 3

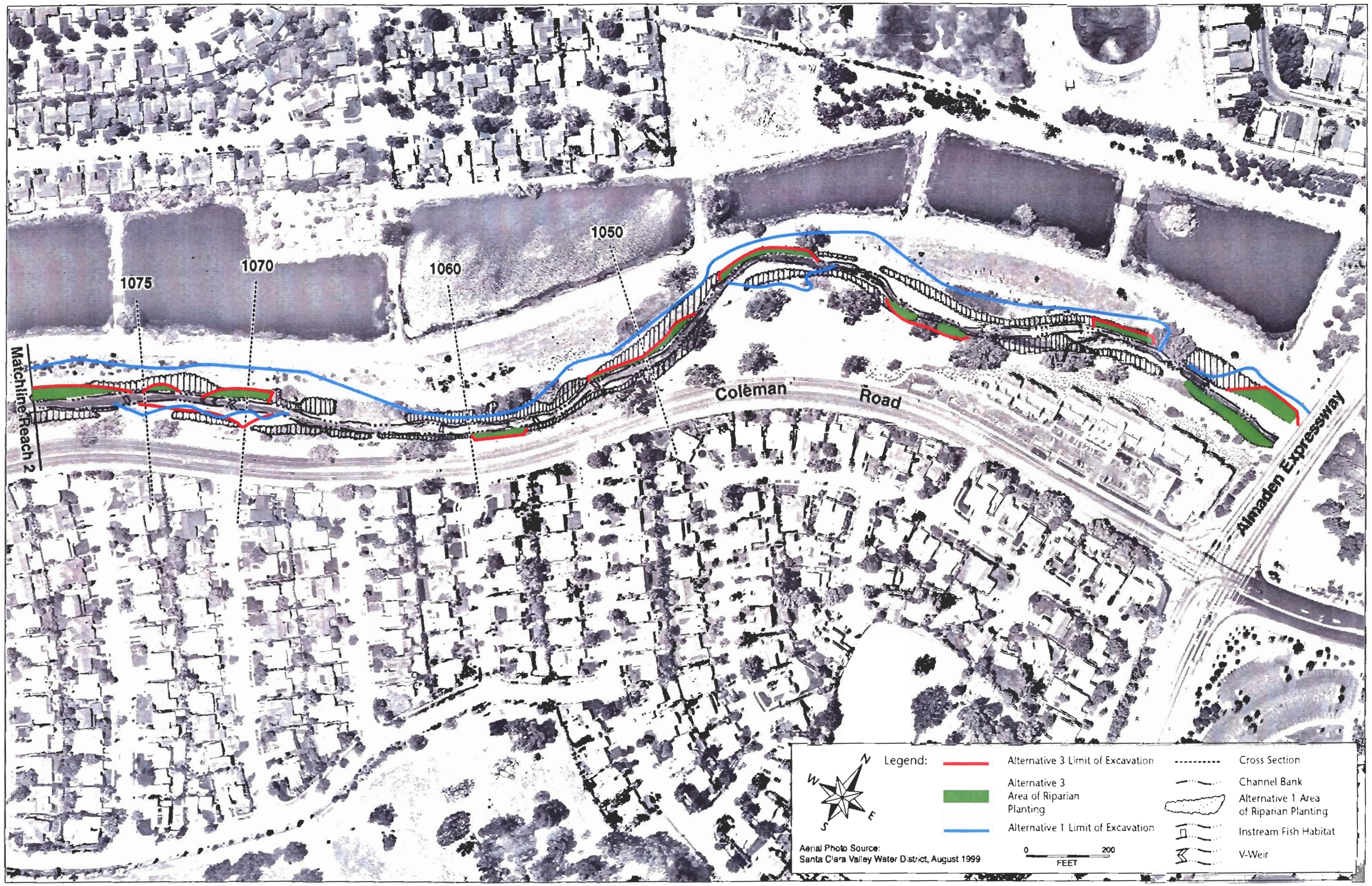
Project features proposed for Reach 3 will focus on modifying the existing floodplain in key areas to provide planting surfaces for riparian vegetation. IWM will be added to stabilize the bed and banks, to increase cover, and to increase channel complexity and hydraulic diversity. Woody material will also be placed on the bar surfaces in Reach 3 to stabilize the bars and provide additional planting sites.

The planting program in this reach will focus on planting riparian vegetation within the 15-foot zone adjacent to the low-flow channel, and on sites created by the installation of bank structures and placement of IWM on the backs of bars. Oak woodland species will be planted on the higher surfaces to fill gaps between existing vegetation.

5.1.3.4 Reach 4

Under Alternative 3, only minor modifications will be made to the channel in the downstream segment of Reach 4. Woody material will be placed in an existing erosion cusp to protect the maintenance road, shelter young riparian vegetation, and provide additional planting sites.

The planting program in Reach 4 will focus on planting riparian vegetation and oak woodland species within existing stands of riparian vegetation. Along the south bank of the creek, existing riparian vegetation upstream will be preserved. Additional project features that will be implemented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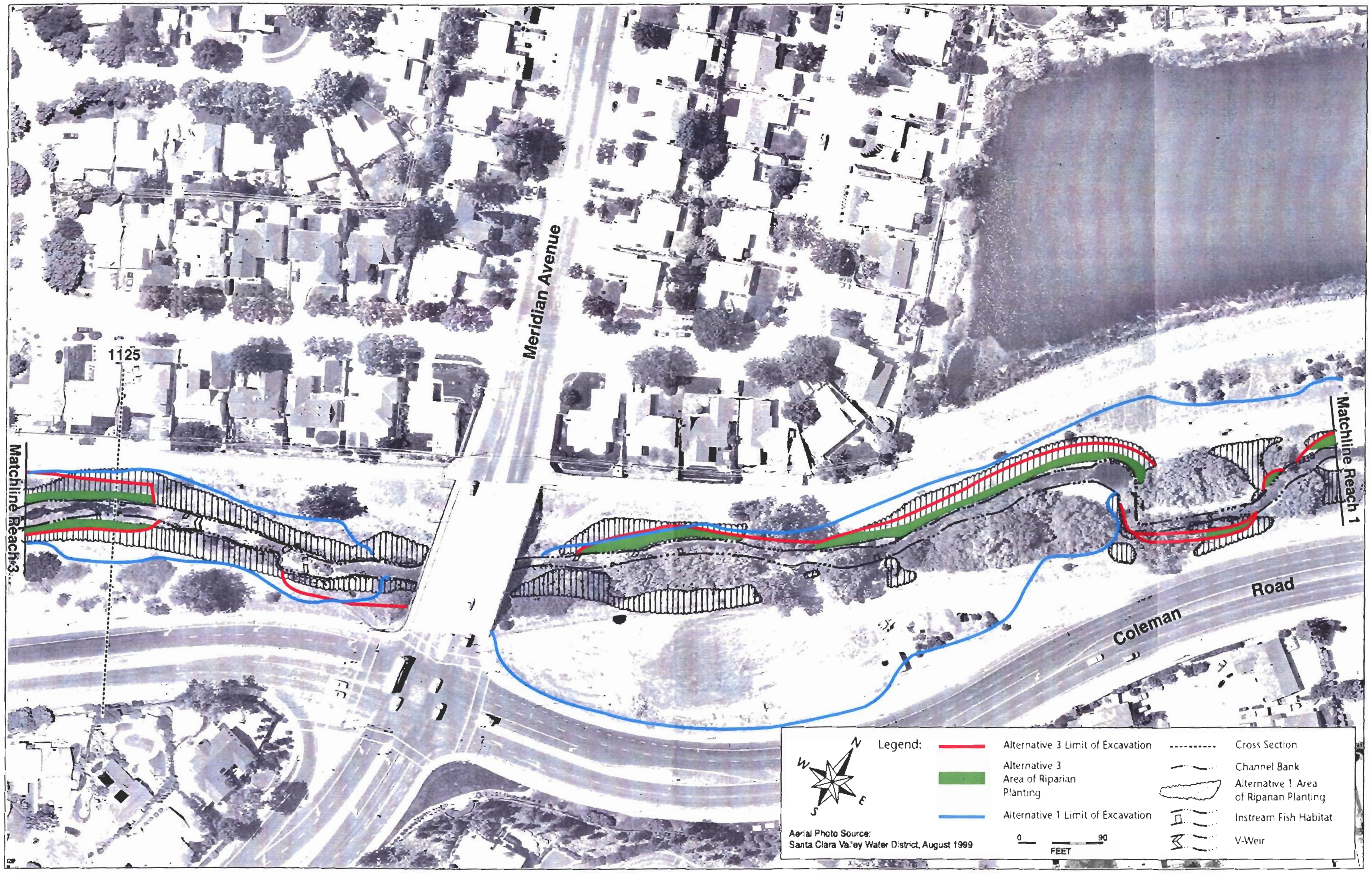
Legend:
Alternative 3 Limit of Excavation
Alternative 3 Area of Riparian Planting
Alternative 1 Limit of Excavation
Cross Section
Channel Bank
Alternative 1 Area of Riparian Planting
Instream Fish Habitat
V-Weir
0
200
FEET

Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 5-12
Alternative 3 - Reach 1


Meridian Avenue
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Matchline Reach 3
Matchline Reach 1
Coleman Road
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Legend:
Alternative 3 Limit of Excavation
Alternative 3 Area of Riparian Planting
Alternative 1 Limit of Excavation
Cross Section
Channel Bank
Alternative 1 Area of Riparian Planting
Instream Fish Habitat
V-Weir
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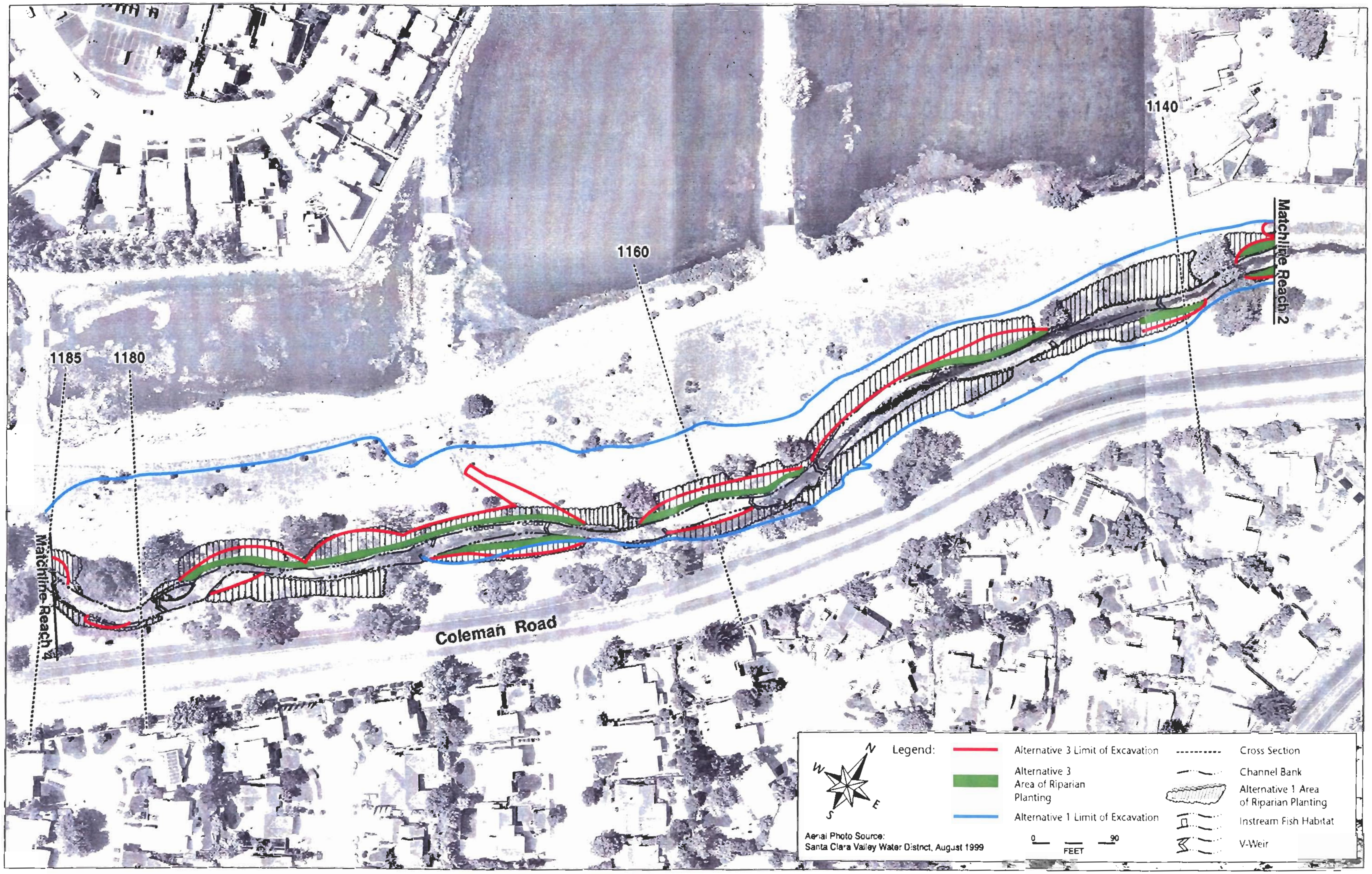
Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 5-13
Alternative 3 - Reach 2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Matchline Reach 2
Matchline Reach 4
Coleman Road
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Alternative 3 Limit of Excavation
Alternative 3 Area of Riparian Planting
Alternative 1 Limit of Excavation
Cross Section
Channel Bank
Alternative 1 Area of Riparian Planting
Instream Fish Habitat
V-Weir
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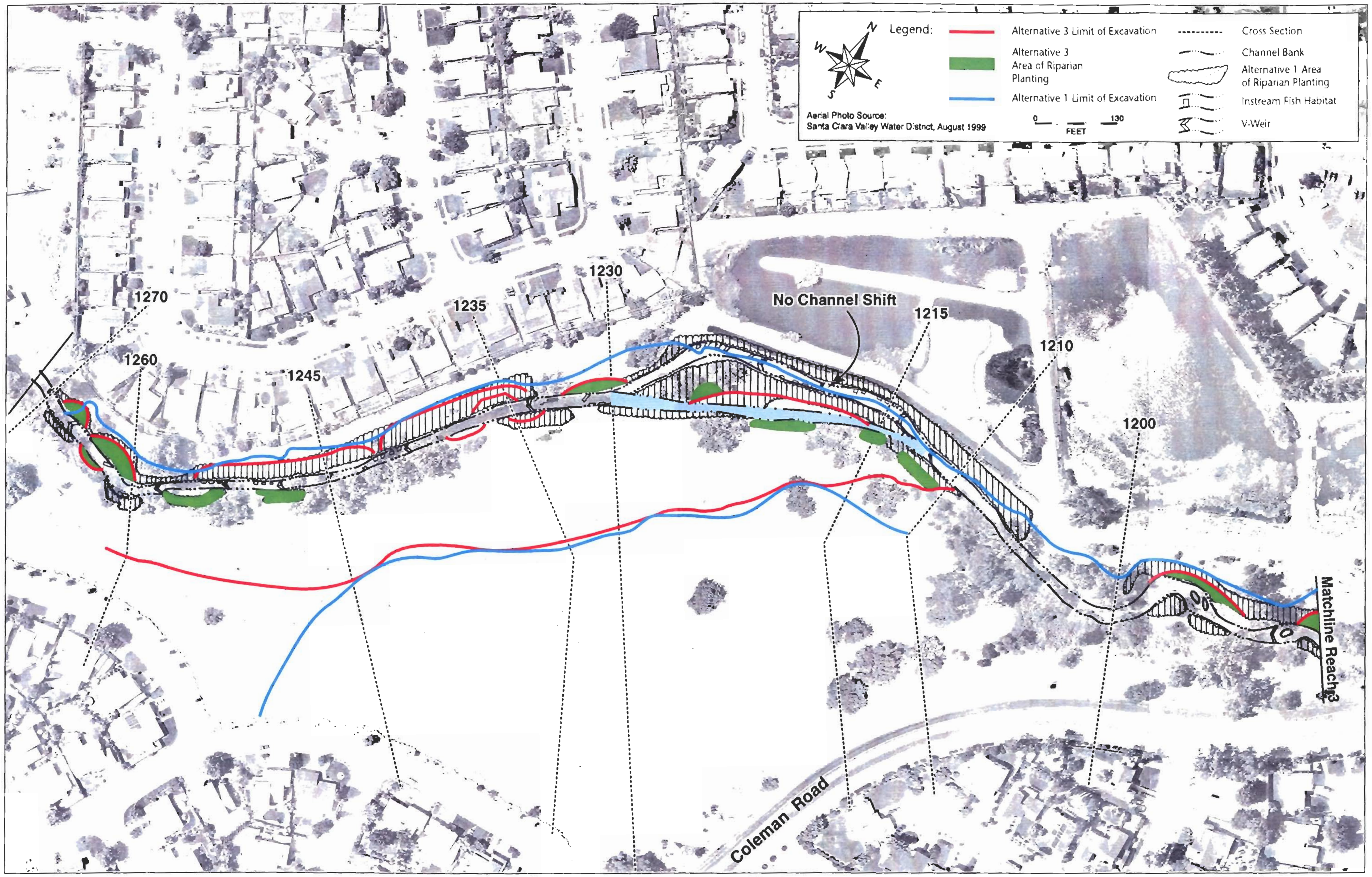
FEET
Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 5-14
Alternative 3 - Reach 3


Legend:
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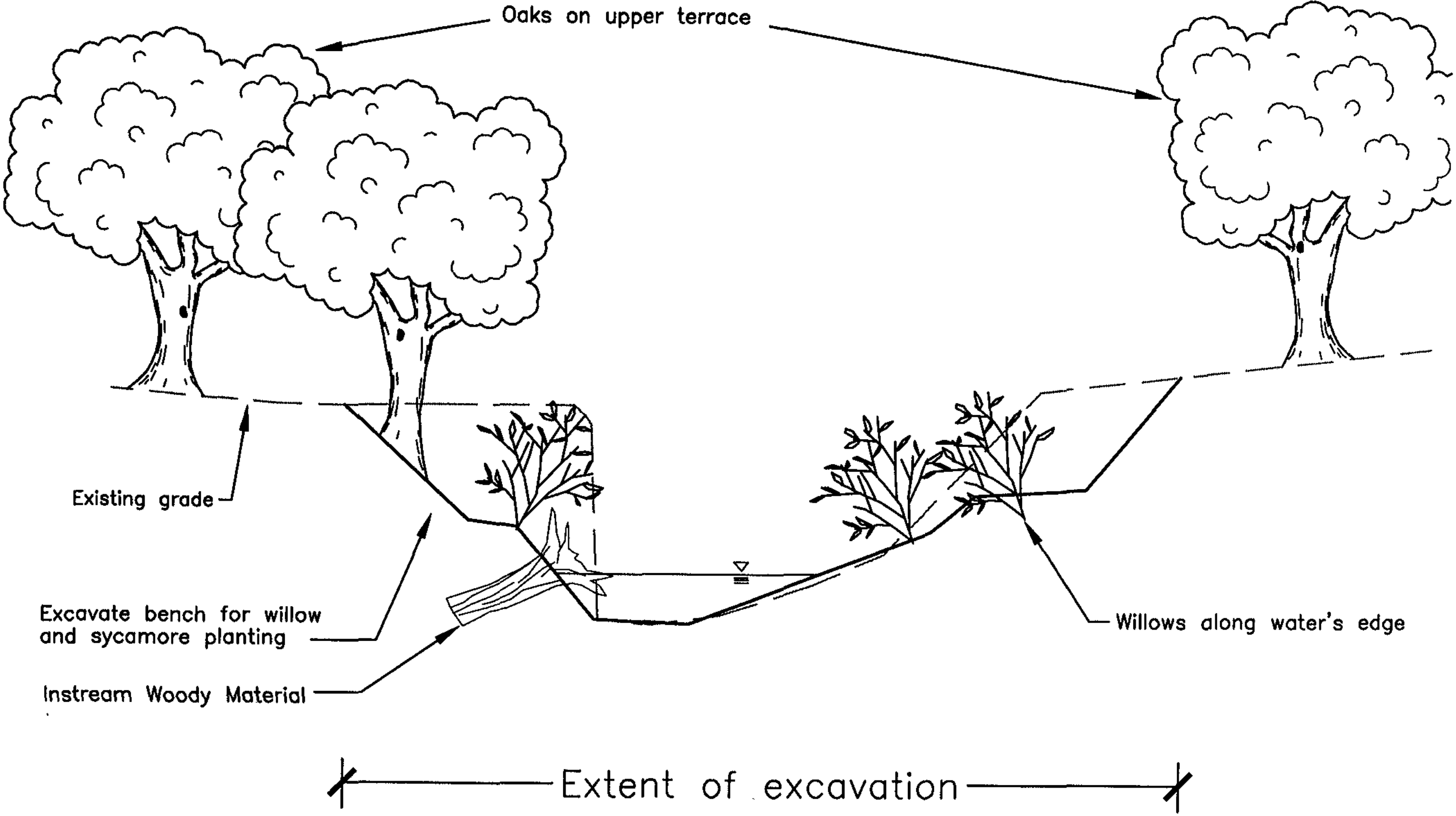
Alternative 3 Limit of Excavation
Alternative 3 Area of Riparian Planting
Alternative 1 Limit of Excavation
Cross Section
Channel Bank
Alternative 1 Area of Riparian Planting
Instream Fish Habitat
V-Weir
Aerial Photo Source:
Santa Clara Valley Water District, August 1999
0
130
FEET
1270
1260
1245
1235
1230
No Channel Shift
1215
1210
1200
Matchline Reach 3
Coleman Road

Figure 5-15
Alternative 3 - Reach 4



Jones & Stokes

Figure 5-16
Alternative 3 - Typical Cross Section

in Reach 4 include installing IWM to provide planting sites on bar surfaces and installing rootwads and other structures to stabilize the outside banks of meander bends and to create instream cover.

5.1.3.5 Cost

The estimated cost of Alternative 3 is $4,495,370. A detailed breakdown of costs associated with this alternative is provided in Appendix D.

5.1.4 Alternative 4: No-Project Alternative

The No-Project Alternative assumes "existing conditions" and evaluates the "likely future conditions" in the Project area without implementation of the recommended project. Under the No-Project Alternative, no additional riparian and SRA cover habitat would be created and aquatic habitat would not be enhanced within the Project area. Water temperatures and aquatic habitat would continue to be less than optimal for anadromous fish species.

5.2 EVALUATION OF ALTERNATIVES

Table 5-1 shows the extent to which the three alternatives meet the objectives developed for the Guadalupe Creek Restoration Project and Table 5-2 provides a summary comparison of the activities proposed under each of the three Project alternatives. Factors presented in Table 5-2 include: earthwork, planting, instream habitat features, estimated costs, and potential impacts on existing resources. The EIR/EIS presents a more detailed discussion of the potential impacts associated with the alternatives.

5.3 SELECTION OF THE RECOMMENDED PROJECT

During the preliminary design process, the District held two public meetings to introduce the public and interested organizations to the Project, to solicit input on Project objectives and conceptual restoration alternatives, and to identify any relevant issues or concerns. The meetings were held on February 17, 2000, and April 11, 2000. Public comments received at these meetings were considered during the development and evaluation of the Project alternatives and selection of the recommended project. Based on a comparison and evaluation of the benefits, estimated costs, and potential impacts associated with the 3 Project alternatives, Alternative 1: Floodplain and Channel Modification has been selected as the "recommended project" for implementation by the District. Implementation of the Floodplain and Channel Modification Alternative would meet the Project's primary objective of restoring SRA cover vegetation and improving aquatic habitat for anadromous fish, would provide substantial additional benefits, and would result in a substantial increase in biological resources in the Project area. The net benefits to the environment associated with the Project, the establishment of 6 acres of riparian vegetation and approximately 13,000 lf of SRA cover vegetation are much greater than those associated with the other alternatives. The recommended project also meets the secondary objectives of creating riparian habitat, enhancing aquatic habitat, and restoring natural ecological and physical processes while maintaining existing flood conveyance capacity and minimizing impacts on existing resources. Although implementation of the recommended project would involve a greater commitment of District resources than the other alternatives, the recommended project would provide substantially greater net benefits (i.e., linear feet and acreage of SRA cover and riparian vegetation) than the other alternatives. In addition, under the recommended project a significant amount of riparian vegetation that could be used to mitigate impacts associated with future District projects would be established.

The recommended project has also been identified as the environmentally superior/environmentally preferable alternative pursuant to the requirements of CEQA and NEPA. The environmentally superior/environmentally preferable alternative is the alternative that will result in the least damage to the biological and physical environment and the alternative that will protect, preserve, and enhance historic, cultural, and natural resources while accomplishing the Project's objectives. In addition, features associated with the recommended project (e.g., extensive floodplain excavation) may improve existing mercury-related site conditions (e.g., sediment transport, methylation, bioaccumulation) and result in a greater net benefit to aquatic habitat and water quality than the other alternatives.

5.4 BEST MANAGEMENT PRACTICES

Best Management practices (BMPs) are methods, measures, or practices that avoid, reduce or minimize a project's effects on various resources. BMPs include, but are not limited to, structural and nonstructural controls and operations and maintenance procedures. They can be applied before, during, and after activities to reduce or eliminate environmental effects. BMPs are part of the project design and/or constitute routine District procedures; by contrast, mitigation measures are developed separate from the project design to address specific environmental impacts.

The following sections list and describe BMPs that will be incorporated into the recommended project to reduce or eliminate environmental effects. In addition to the BMPs described here, project implementation and maintenance will adhere to the procedures listed in the District's most current BMP plan (Santa Clara Valley Water District 1999). Not all of the BMPs listed below are for potentially significant effects. Many BMPs are included to reduce less-than-significant impacts to even lower levels as part of the District's commitment to environmental stewardship.

Table 5-1. Extent to Which the Alternatives Meet the Project Objectives

	Project Alternatives		
	Channel and Floodplain Modification (Alternative 1)	Reduced Channel and Floodplain Modification (Alternative 2)	Minimal Channel and Floodplain Modification (Alternative 3)
Primary Objectives			
Restore shaded riverine aquatic (SRA) cover vegetation and improve aquatic habitat for anadromous fish in lower Guadalupe Creek, between Almaden Expressway and Masson Dam	+++	++	+
Secondary Objectives			
Create 5,915 linear feet of SRA cover vegetation that may serve as off-site mitigation for impacts associated with the Guadalupe River Flood Protection Project	+++	++	+
Create riparian habitat, including SRA cover vegetation, that may provide mitigation credit for future District projects	++	+	+
Enhance or restore habitat for special-status fish and wildlife species, as consistent with other project objectives	+	+	+
Restore physical processes and ecological functions along the project reach of Guadalupe Creek	++	+	+
Protect existing infrastructure in the project area	++	++	+
Maintain existing flood conveyance capacity	+	+	+
Minimize impacts on existing resources	+	+	++
Improve recharge of groundwater aquifers	0	0	0
Minimize long-term operations and maintenance requirements	++	+	+
Minimize impacts on existing water management operations	+	+	++
Design project so that it does not preclude future recreation uses that are compatible with other project objectives	+	+	+
Strive to meet regional planning objectives as outlined in relevant regional planning documents	+	+	+

Notes:

0 = does not meet objective - neutral or minor change from existing conditions.

+ = meets objective

++ = meets objective and provides moderate additional benefits

+++ = meets objective and provides substantial additional benefits.

Table 5-2. Comparison of Features Associated with the Project Alternatives

	Project Alternatives		
	Channel and Floodplain Modification (Alternative 1)	Reduced Channel and Floodplain Modification (Alternative 2)	Minimal Channel and Floodplain Modification (Alternative 3)
Earthwork			
Channel realignment	2,500 linear feet	1,200 linear feet	300 linear feet
Soil importation	13,000 cubic yards	8,500 cubic yards	7,000 cubic yards
Soil removal and disposal	42,000 cubic yards	31,000 cubic yards	11,500 cubic yards
Fisheries Habitat Improvements			
Rootwads and bar IWM	270 pieces	220 pieces	220 pieces
Stream barbs and buried groins	54 pieces	35 pieces	40 pieces
V-weirs and cross weirs	25 pieces	25 pieces	28 pieces
Bank Protection			
Bank protection	725 linear feet	1,095 linear feet	1,285 linear feet
Total Planting Area			
Riparian vegetation	6.4 acres	4.0 acres	2.3 acres
SRA cover vegetation	13,000 linear feet	9,500 linear feet	6,800 linear feet
Potential Impacts			
Phase 1 plantings	611 linear feet (0.29 acre)	611 linear feet (0.29 acre)	0 linear feet
Riparian vegetation	250 linear feet (0.30 acre)	162 linear feet (0.13 acre)	0 acre
Mitigation Requirements			
Phase 1 plantings (1:1 replacement ratio)	611 linear feet (0.29 acre)	611 linear feet (0.29 acre)	0 linear feet
Riparian vegetation (3:1 replacement ratio)	750 linear feet (0.90 acre)	486 linear feet (0.39 acre)	0 acre
Net Planting Area[a]			
Riparian vegetation	5.21 acres	3.32 acres	0.8 acre
SRA cover vegetation	11,639 linear feet	8,403 linear feet	6,800 linear feet
Estimated Costs			
Estimated Costs	$8,492,550	$6,819,010	$4,495,370

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[a] Net planting area represents the acreage and linear feet of SRA cover and riparian vegetation remaining after mitigation of project-specific impacts (Total Planting Area - Mitigation Requirements = Net Planting Area).

5.4.1 Vegetation Protection Measures

Measures to protect riparian vegetation during construction will be implemented under the BMPs included in the recommended project's construction drawings and specifications. Prior to Project construction, plastic barrier fencing will be erected or other similar measures will be implemented along the boundaries of the construction area in order to protect adjacent vegetation. If any protected trees are damaged during construction, they will be trimmed under the direction of a qualified arborist to minimize the risk of disease. If any trees not approved for removal are damaged beyond recovery during construction, they will be replaced either with trees of the same species or with trees of another approved species listed in the Project drawings and specifications.

5.4.2 Storm Water Pollution Prevention Plan

The recommended project is subject to the stormwater quality regulations of the NPDES, described in Section 402 of the federal CWA (see related discussion in Chapter 2. In California, the NPDES program requires that any construction activity disturbing an area of 5 acres or more comply with the statewide General Permit, as administered by the SWRCB. The General Permit requires the elimination or minimization of stormwater and non-stormwater discharges from construction sites and the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) for the project. The SWPPP must be retained at the construction site. Implementation of the SWPPP will be monitored during project construction. Upon completion of project construction, SWRCB will be notified that all state and local requirements have been met.

The primary elements of a SWPPP include:

- a description of site characteristics, including runoff and streamflow characteristics and soil erosion hazard;
- a description of proposed construction procedures;
- a description of measures that will be implemented for erosion and sediment control (discussed in more detail below);
- a description of measures that will be implemented to prevent toxic materials spills (spill prevention and response plan, discussed in more detail below); and
- a description of proposed construction-site housekeeping practices.

In addition to these primary elements, the SWPPP must also specify that the extent of soil and vegetation disturbance will be minimized and that the area of soil disturbed at any given time will be minimized.

The following sections describe the required components of the erosion and sediment control measures and the spill prevention and response plan included in the SWPPP.

5.4.2.1 Erosion and Sediment Control Measures

Because increased sediment input to Guadalupe Creek may have an adverse impact on aquatic species and their habitat, measures to control the recommended project's contribution to erosion and movement of sediment into the creek will be implemented. These may include both vegetative and structural measures as well as construction-site housekeeping practices. The contractor selected for Project construction will:

- conduct construction activities during the dry season;
- conduct all construction work in accordance with site-specific construction plans that minimize the potential for increased sediment inputs to the creek;
- divert concentrated runoff away from channel banks;
- minimize vegetation removal;
- identify with construction fencing all areas that require clearing, grading, revegetation, or recontouring and minimize the extent of areas to be cleared, graded, recontoured, or otherwise disturbed;
- grade and stabilize spoils sites to minimize erosion and sediment input to the creek and generation of airborne particulate matter (PM10) (see discussions under *Soil Management* and *Measures to Implement BAAQMD's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* below);
- implement erosion control measures as appropriate to prevent sediment from entering the creek channel or other watercourses to the extent feasible, including the use of silt fencing or fiber rolls to trap sediments and erosion control blankets on channel banks;
- mulch disturbed areas as appropriate and plant with appropriate species as soon as practicable after disturbance; and
- avoid operating equipment in flowing water by using temporary cofferdams or other suitable structures to divert flow around the channel and bank construction area.

5.4.2.2 Spill Prevention and Response Plan

As part of the Project SWPPP, the contractor selected for the recommended project will prepare a spill prevention and response plan that regulates the use of hazardous and toxic materials, such as the petroleum-based fuels and lubricants for construction equipment. The District will oversee implementation of the spill prevention and response plan. Elements of the plan will ensure that:

- workers are trained to avoid and manage spills;
- construction and maintenance materials are prevented from entering the creek;
- all spills are cleaned up immediately and appropriate agencies are notified of any spills and of the cleanup procedures employed;
- staging and storage areas for equipment, materials, fuels, lubricants, solvents, and other possible contaminants are located at least 100 feet away from the creek;
- vehicles are removed from the creek's normal high-water area before refueling and lubricating;
- vehicles are immediately removed from work areas if they are leaking; and
- equipment is not operated in flowing water (suitable temporary structures are installed to divert water around in-channel work areas).

5.4.3 Soil Management Measures

Soil Management Plan. Before construction a Soil Management Plan (SMP) will be developed for the Guadalupe Creek Restoration Project. The SMP will include protocols for classifying the content of wastes in soil based on standard analytical tests used for the disposal of material at appropriately licensed disposal sites. The SMP will also provide criteria for classification of material considered inert based on California's standard waste extraction test procedures, as well as procedures for disposal and reuse of these materials. At an appropriate time before disposal, confirmation sampling for all constituents of concern, including metals, hydrocarbons, and polynuclear aromatic hydrocarbons will be conducted and the soil classified pursuant to the criteria outlined in the approved SMP. Before Project implementation, the Soil Management Plan will be updated to reflect final Project design and to incorporate input from the RWQCB regarding management of soils containing elevated mercury concentrations. The updated Soil Management Plan will be submitted to the RWQCB for approval before implementation. The following additional restrictions on soil management will be included in the SMP:

- Sediments with mercury concentrations that exceed hazardous waste criteria under federal or state law must be disposed of offsite in appropriately licensed disposal sites. The determination of hazardous properties shall comply with all applicable statutes and regulations pertaining to hazardous wastes.

- Excavated soils with mercury concentrations not exceeding hazardous waste criteria but greater than 1 part per million (ppm) may not be reused on site unless such sediments are placed above the low flow channel or in adjacent areas where frequent exposure to overbank flow is not anticipated to occur (i.e., above the water surface elevation defined by the 3-year recurrence interval or as backfill away from the channel).

- Excavated surfaces above the 3-year recurrence interval elevation which contain mercury concentrations higher than hazardous waste levels will be overexcavated and replaced with soils meeting the above criteria for onsite reuse. Excavated surfaces below the elevation of the 3-year recurrence interval that contain unconsolidated soils will be overexcavated to a depth of 6 inches and replaced with clean imported soil. Some incidental movement of soil within the active channel may occur during the installation of IWM.

The 1 ppm requirement is based on regulatory guidance from the RWQCB (August 2000) which states that reducing bank sediment concentrations of mercury to 1 ppm or less will reduce water column concentration of total recoverable mercury. Water quality in the Project area presently exceeds basin plan numeric water quality objectives for mercury. Therefore, incorporation of the proposed soil reuse restrictions will result in improved water quality under postproject conditions.

5.4.4 Construction Period Limits

To reduce the likelihood of adverse impacts on rearing juvenile steelhead and chinook salmon and on adult fish migrating to upstream spawning areas, in-channel construction, including both streambank and channel bed construction, will be limited to the summer low-precipitation period (April 15–October 15), with the condition that construction requiring stream dewatering, stream crossings, or instream work may not commence before May 1. Furthermore, work will be permitted to commence on May 1 only if the stream monitoring criteria have been satisfied by that date. Stream monitoring criteria that must be satisfied will include a determination that average daily water temperatures have exceeded 68 °F for at least 5 consecutive days and that outmigrating salmonids are absent. Determination of the absence of juvenile chinook salmon and steelhead in May will be based on ongoing downstream migrant trapping observations during the previous 14 days. If stream monitoring criteria are not met, in-channel work and dewatering will not be allowed to commence until June 1. If necessary, upstream passage for chinook salmon will be provided through or around construction sites from September 1 through October 15. The determination of the need to provide passage will be based on the occurrence of more than 25 adult chinook salmon, on flow conditions, and on a cooperative assessment of passage needs by the District, NMFS, and DFG. Construction outside the summer low-precipitation period will require previous approval from DFG and NMFS.

5.4.5 Construction-Area Fish Management Measures

During Project construction, streamflow will be diverted at Masson Dam into the Los Capitancillos percolation pond system. Diversion activities will follow the guidelines listed below.

- Flow will be incrementally diverted from the creek at the upstream boundary of the Project area. Diversion will increase progressively over a 4-hour period, by the following increments: 50%, 75%, 90%, 95%, and 100%. Flow reductions will be conducted under the supervision of a qualified fisheries biologist. This incremental reduction in flow will allow fish to move downstream.

- All native aquatic vertebrates and larger invertebrates will be moved by a qualified fisheries biologist during dewatering.

- Fish will be removed from pools remaining after flow is diverted from the Project reaches of the creek. The District, NMFS, and DFG will cooperate to develop a method and protocol for capturing and relocation of stranded fish. Qualified fisheries biologists will transport captured fish immediately to a flowing river segment. Fisheries biologists will contact NMFS immediately if any steelhead or chinook salmon are found dead or injured, except for spawned-out adult chinook salmon.

- If a fisheries biologist determines that juvenile chinook salmon and steelhead are present during June and that construction activities may impede their downstream passage, a fish trap will be placed above the upstream barrier and operated by a fisheries biologist. The determination that juvenile chinook salmon and steelhead are present during June will be based on their occurrence during any of the previous 14 days in ongoing downstream migrant trapping. The trap at the construction site will be removed if juvenile chinook salmon and steelhead are not captured at the construction site or by ongoing downstream migrant trapping during 14 consecutive days. In order to maintain fish in good condition, all migrating steelhead and juvenile chinook salmon will be removed from the trap every 24 hours, or at another appropriate time interval, as determined by a qualified fisheries biologist. Captured fish will be counted, measured, and transported immediately to a flowing creek segment that allows downstream migration. Additional details of downstream migrant trapping, including specific reporting requirements, will be coordinated with NMFS.

- Adult chinook salmon may arrive at the downstream end of the Project area before the end of construction on October 15. If necessary, upstream passage for chinook salmon will be provided through or around the construction site from September 1 through October 15. The determination of the need to provide passage will be based on the occurrence of more than 25 adult chinook salmon, on flow conditions, and on a cooperative assessment of passage needs by the District, NMFS, and DFG. The determination that adult chinook salmon are present will be based on trapping at an appropriate downstream location or on an appropriate alternative method developed cooperatively by the District, NMFS, and DFG.

5.4.6 Measures to Comply with Migratory Bird Treaty Act

The Project site is located in and adjacent to habitat that may support nesting birds protected under the federal Migratory Bird Treaty Act (MBTA). Barrier fencing erected as part of the Project's vegetation protection measures will also protect nesting vegetation located outside the boundaries of the construction area. If any construction occurs during the February 16–July 31 migratory bird nesting season, a qualified biologist will survey the construction area for eggs and young migratory birds immediately prior to construction. If eggs or migratory birds are found inside the construction area boundaries, the District will develop appropriate protective measures and will inform DFG of its actions.

5.4.7 Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities

The following list of measures for controlling PM10 emissions will be implemented during Project construction. These measures are contained in the Bay Area Air Quality Management District's (BAAQMD's) Feasible Control Measures for PM10 Emissions from Soil Removal Activities (Bay Area Air Quality Management District 1996).

- All active construction sites will be watered at least twice daily. Watering should be conducted frequently enough to prevent the generation of visible dust emissions.
- All trucks hauling soil, sand, and other loose materials will be covered or will be required to maintain at least 2 feet of freeboard.
- All unpaved access roads, parking areas, and staging areas will be watered three times daily, or will be stabilized using nontoxic soil stabilizers.
- Apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water twice daily, or apply (non-toxic) soil stabilizers to exposed stockpiles.
- Streets will be swept daily with water sweepers if visible soil material is carried onto adjacent public streets.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 miles per hour (mph).
- Traffic speeds on unpaved roads will be limited to 15 mph.

5.4.8 Measures to Address Traffic-Related Effects

The District will require the selected contractor to prepare and implement a traffic safety plan. This plan will address appropriate vehicle size and speed, travel routes, detour and closure plans, flagperson requirements, locations of turnouts to be constructed, coordination with law enforcement and fire control agencies, coordination with Caltrans personnel (for work affecting state road rights-of-way), emergency access to ensure public safety, and need for traffic and speed-limit signs. Additionally, the contractor will limit transportation of imported and exported materials to non-peak traffic commute hours (9:00 a.m. to 4:00 p.m., Monday through Friday).

5.4.9 Measures to Address Cultural Resources

An archaeologist meeting the Secretary of the Interior's Standards for Professional Archaeologists will be on call during ground-disturbing activities. If a prehistoric archaeological site is discovered, criteria of the NRHP will be used to evaluate the site for significance. A Native American monitor will be present during the evaluation of the site's significance. Work in the area will be stopped until the site is evaluated and appropriately treated. If prehistoric or historic archaeological sites that appear eligible for NRHP are discovered, procedures stipulated under implementing regulations for the NHPA (36 CFR 800) will be followed. These procedures include consulting with the state historic preservation officer (SHPO) to confirm eligibility of the site(s) for the National Register and development of a Memorandum of Agreement that specifies treatment for the site(s). Treatment may include data recovery, site avoidance, or capping the site to avoid further impacts.

If human remains of Native American origin are discovered during project construction, relevant procedures identified in the California State public health and safety codes will be followed. Public Resources Code Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the county coroner can determine whether the remains are those of a Native American. If the remains are determined to be those of a Native American, the coroner must contact the California Native American Heritage Commission. If human remains are discovered, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

1. The Santa Clara County Coroner has been informed and has determined that no investigation of the cause of death is required; and

2. if the remains are of Native American origin:

    a. the descendants of the deceased Native American(s) have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98; or

b. the Native American Heritage Commission was unable to identify a descendant or the descendant failed to make a recommendation within 24 hours after being notified by the commission.

According to California Health and Safety Code, six or more burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052).

5.4.10 Measures to Address Noise-Related Effects

The contractor selected for the Project will be required to comply with all relevant provisions of the City noise ordinance; noise-reducing construction practices will be employed. For example, all construction equipment will be required to have sound-control devices at least as effective as those originally provided by the manufacturer, and no equipment will be permitted to have an unmuffled exhaust. In general, construction will take place between 7:00 a.m. and 5:00 p.m., Monday through Friday, and no construction activities will occur on holidays or weekends. Extending weekday hours and working weekends may be necessary for short periods to complete some aspects of the Project; however, these periods will be limited. In addition, the contractor will implement appropriate additional noise mitigation measures, including, but not limited to, the following: changing the location of stationary construction equipment, shutting off idling equipment, and notifying adjacent residents in advance of construction work.

- assessing the ability of the Project to meet the Project objectives;
- identifying and analyzing potential effects to existing biological resources, hydrology, hydraulic capacity, and adjacent infrastructure; and
- determining quantity take-offs, developing cost estimates, and preparing the contract documents.

The recommended alternative also provides a format for soliciting additional input and direction from the District and key stakeholders before developing the detailed design.

Chapter 6. Maintenance Program

The Project incorporates a range of short- and long-term maintenance activities designed to ensure that the restored habitats are successful and that flood conveyance capacity is maintained. In addition, the Project site will be monitored in accordance with the monitoring and adaptive management program established by the Downtown Project MMP. The contractor selected by the District will be responsible for maintaining and monitoring the plantings and for maintaining the restoration sites during the 3-year establishment period. The District will assume maintenance responsibilities after the 3-year establishment period.

6.1 SHORT-TERM MAINTENANCE AND MONITORING

6.1.1 Monthly Maintenance

During the first 3 years after construction, monthly maintenance operations will include: weed control, irrigation system operation, supplemental watering, replacement planting, and reseeding. Plant establishment will begin on the first day after acceptance of the plant installation. Estimated maintenance costs for the 3-year establishment period are approximately $300,000. A detailed breakdown of Project costs including maintenance is provided in Table 7-1.

Maintenance operations will include checking each plant location a minimum of once every 2 weeks during times when the irrigation system is operating and a minimum of once every month during times when the irrigation system is not operating. During these maintenance operations, the Contractor will assess the condition of the plantings, the extent of weed growth, and the stability of the soil berm, and will evaluate the soil moisture around each plant to ensure that the irrigation system is providing adequate moisture to each plant during the irrigation season.

At the end of the 3-year maintenance period, the District will inspect the Project site to evaluate the acceptability of the seeding, installation, and plant establishment practices.

In the event that plants are lost or severely damaged as a result of floodwaters flowing from the creek into the planting area, the Contractor will be responsible for replacing up to 10% of the original number of plants. If any additional plants are lost or severely damaged or if loss of or damage to the irrigation system occurs solely due to flooding, the District may choose to supply replacement plants and may request the Contractor to install the plants or replace or repair the irrigation system.

6.1.2 Materials and Placement

Soil berms will be repaired and replaced as necessary to protect plants and assist in irrigation.

As part of maintenance activities, the Contractor will identify the most vigorous oak seedling in each plant basin at the end of 6 months after planting of acorns. All other oak seedlings surviving within the same plant basin will be removed by clipping off the leaders at the ground surface.

6.1.3 Weed Control

Weed control will consist of maintaining all planting basins or an area 4 feet in diameter around each plant free of weeds. Weed control will be required in the seeded areas. Weed control in the cover crop area will use only hand-pulling or herbicide spot treatment methods.

Weeds that grow within the planting basins or an area 4 feet in diameter around each plant will be removed before they reach 4 inches in height or before they cover 30% of the planting basin. In addition, mandatory weeding of all planting basins will occur three times during each of the first 3 years of maintenance.

Weed removal will be done by hand-pulling, mechanically (cutting at or below ground level), or by using herbicides and surfactants approved for use in floodplain areas. Weed removal will cause minimal disruption to the root systems of the installed plants and basins.

Herbicide will be applied according to manufacturer's specifications and without herbicide drift. Personnel performing weed control will be trained to identify species installed and will remove only those plants within the planting basins that were not deliberately planted. Wherever possible, desired native plant volunteers will be retained.

6.1.4 Irrigation Operation

The Contractor will be responsible for operating the irrigation system and for maintaining it in a fully operational condition. The Contractor will be responsible for replacing or repairing any part of the irrigation system damaged as a result of improper maintenance activities or installation, normal wear and tear, defective materials, vandalism, or acts of nature (e.g., wildfire).

The Contractor bears full responsibility for watering plants in a manner that will maintain plant health and vigor and promote plant establishment and growth. The irrigation system will be operated, at a minimum, for the first two growing seasons.

The length and frequency of the irrigation cycles during the second and third growing seasons will depend on the health and vigor of the plantings. The beginning and shutdown dates for the irrigation schedule will depend on the weather. If the majority of the plant material appears to be stressed and in danger of perishing, the Contractor will consult the District to determine the frequency and duration of additional waterings. The Contractor will be responsible for supplemental watering of the plant materials, if watering is required when the irrigation system is not operational.

Irrigation maintenance will include examining the irrigation system once every 2 weeks during the irrigation season, testing each valve location to ensure that the controller is operational, and checking each bubbler location for leaks or blocked lines. At the end of each irrigation season, the Contractor will winterize the system by turning off the controller, closing the shutoff valve at the water service point, and draining water from all above-grade irrigation pipes.

6.2 REPLACEMENT PLANTING

Annual inspections of the site will be scheduled for 1 day each year to evaluate plant establishment and to determine plant mortality rates. During the first 3 years after construction, the allowable mortality rate will be 10% of the original number of plants. Plant losses in excess of 10% will be replaced in the fall of each of the first 3 maintenance years.

Any dead plants in excess of the allowed mortality rates that are identified at the annual inspection will be replaced by the Contractor. In anticipation of procuring required replacement plant materials, an early-season site inspection will be conducted to assess plant mortality and estimate the number of replacement plants that will be required. Dead plants will typically be replaced with plants of identical species and original planting size unless the District determines that substitutions of another species or size should be made. Plants larger than those originally planted will not be required. The Contractor may submit written recommendations for species substitutions based on documented survivorship records for plants growing at the Project site to the District at the time of the annual inspection.

All plant locations are limited to a maximum of two (2) replacement plantings. The Contractor will remove dead plants before installing replacement plants. Replacement plants will be derived from propagules collected in the Guadalupe River watershed. The District may assist the Contractor in finding sources for acceptable replacement plants. Upon the approval of the Engineer, the Contractor may be allowed to use cuttings or transplants for replacement plantings if suitable stock is unavailable.

6.3 RESEEDING

The Contractor will reseed areas larger than 400 square feet that have less than 15% cover of target species. Reseeding will use a modified seed mix to be approved by the District. Fertilizer will not be applied to seeded areas.

6.4 PLANT ESTABLISHMENT FORMS

Throughout the Maintenance Period, the Contractor will be responsible for keeping daily records documenting irrigation and weed control activities and plant mortality. The Contractor will compile all data recorded during the plant establishment period. At the end of each month during the first 3 years of maintenance, the Contractor will compile the month's records (including irrigation, weed control, and plant mortality data and any additional observations made during the month) and will submit the record to the District. One record form will be submitted to the District for each month of the first 3 years of maintenance.

6.5 MONITORING

The Downtown Project MMP requires that the District monitor a number of specific indicators and evaluate the project's performance relative to specific, measurable performance objectives. Indicators that will be monitored during the 3-year postconstruction monitoring period include:

- survival of planted trees and shrubs;
- health and vigor of planted trees, shrubs, and seeds;
- natural recruitment of native species;
- total vegetative cover;
- non-native vegetative cover;
- water temperature; and
- anadromous fish passage and habitat quality.

6.6 LONG-TERM MAINTENANCE PROGRAM

Although the Project was designed to require very little long-term maintenance, some activities will be necessary to ensure that the flood conveyance capacity of the Project reaches is maintained. The established monitoring program will be used to identify any potential maintenance issues. Long-term maintenance in the Project area may involve any or all of the following:

- erosion control;
- sediment, large debris, and fallen tree removal;
- instream and bank protection structure maintenance; and
- vegetation control.

Because the primary objective of the Guadalupe Creek Restoration Project is to improve anadromous fish habitat, preventative measures will be taken to minimize channel maintenance activities and resulting habitat disturbance. Any maintenance activities performed within the channel or directly along the bank will be scheduled to prevent adverse impacts on fish and wildlife; disturbance of fish habitat will be avoided from October through March and disturbance of bird nesting habitat will be avoided from March through June. In addition, maintenance activities will incorporate the BMPs described in Chapter 5 of this Engineer's Report.

6.6.1 Erosion Control and Bank Protection

The restoration design incorporates a variety of erosion control and bank protection measures along Guadalupe Creek (see Appendix C. "Draft Submittal – Guadalupe Creek Restoration Plans"). Emphasis is placed on the use of biotechnical techniques for both bank and instream stabilization; biotechnical techniques use natural and semi-natural materials such as wood, rock, and live plants in concert with engineering design principles. Bank protection and erosion control methods proposed for use at the Guadalupe Creek project site include: hydroseeding, rootwads, toe and slope revetments, log cribwalls, coir logs, streambank grading, and revegetation.

The bank protection and erosion control features incorporated in the project design will decrease the potential for catastrophic bank failure; however, some erosion may occur as a result of peak storm events. As a result, the District may be required to implement additional bank stabilization measures to control erosion and protect existing infrastructure. The District will monitor the creek on a regular basis (at least three times per year and following major storm events) to identify actively eroding sites and implement proactive measures to reduce potential impacts and creek disturbance. Sites that are actively eroding will be subject to either: (1) preventative slope protection, or (2) remedial slope protection. Preventative slope protection measures will be implemented and monitored in newly eroded areas. Remedial slope protection measures will be implemented in areas where preventative measures failed or were not sufficient to control continued bank erosion.

The District will select the least invasive biotechnical erosion control measure or measures that can effectively repair eroded banks. General specifications for these measures will be similar to those included in the contract documents prepared for the project; specific design details will be tailored to each site. Erosion control measures should reestablish the preexisting slope and preclude any future erosion control issues. If possible, slope protection will be installed without excavating into the existing bank. Existing native vegetation will not be disturbed during the construction of erosion control measures. Because of the materials used to construct biotechnical erosion control measures, some deterioration is expected through time. Regular monitoring and maintenance of these structures will be performed as necessary (see *6.6.3 Instream and Bank Protection Structure Maintenance* below).

The following sections describe preventative and remedial protection measures that may be implemented within the project area.

6.6.1.1 Preventative Slope Protection

Preventative slope protection measures should be used in areas of minimal erosion that are likely to respond to less invasive techniques. Examples of preventative slope protection measures include planting, brush layering, and bank surface matting. These methods are briefly described below.

6.6.1.1.1 Planting. In many cases, actively eroding areas can be stabilized by backfilling with native soil and planting with trees, shrubs, or grasses. Propagation materials may include cuttings, transplants, container stock, live stakes, and seed. Whenever possible, propagation materials used at the Guadalupe Creek project site should consist of locally native species collected from the Guadalupe River watershed. Biodegradable erosion control fabrics are frequently used in combination with planting to stabilize soil and enable plants to establish.

6.6.1.1.2 Erosion Control Blankets. Erosion control blankets are sheets of natural or synthetic materials that can be anchored on a bank surface to provide immediate protection of the soil surface. Firmly anchored blankets of sufficient strength and thickness can also provide a measure of protection against bank slumping. Erosion control blankets are generally used in combination with live staking or other planting techniques.

6.6.1.1.3 Brush Layering. Brush layering consists of placing live cut branches on the bank and covering them with a lightly compacted layer of soil. A single brush layer usually consists of 3 layers of branches with approximately 3 inches of fill material between branch layers. A lift of 3–5 feet of fill is placed on the brush layer to reconstruct the slope.

6.6.1.1.4 Brush Mattresses. Brush mattresses are constructed by layering a pad or mattress of hardwood brush on a slope and securing it with a grid of stakes and wire or rope. The toe of the mattress is anchored with rock below the waterline. A brush mattress acts as an organic erosion-control blanket, and provides mulch for seedlings and plants established on the bank.

6.6.1.2 Remedial Slope Protection

Remedial slope protection measures are usually engineered and typically require some excavation. They are appropriate for sites experiencing moderate to severe erosion and locations where structures have failed. Remedial slope protection methods include planting and the installation of rootwads, rock toe revetments, and log cribwalls. These methods are briefly described below.

6.6.1.2.1 Rootwads. A rootwad is a tree stump with roots (either live or deadwood) that is installed in a streambank as part of a bank stabilization program. The rootwad bank stabilization method consists of placing rootwads, footer logs, and stream boulders in eroding portions of a creek bank. If desired, a brush layer may also be added above the rootwads to increase habitat complexity. Typically, two rootwads are placed upstream (oriented against flow), 5–6 feet apart. The rootwads are connected by cable to a helical anchor placed at the bottom of the excavation. The rootwads are embedded a minimum of 6 feet into the bank. Rootwads should have a minimum trunk diameter of 18 inches and a minimum bole diameter of 5 feet. One or two footer logs may be placed perpendicular to the rootwads. If one footer log is used, the rootwad should be buried a minimum of 3 feet under the bank surface; with two footer logs, the rootwad should lie 2 feet below grade. Stream boulders are placed between the rootwads and footer logs to form a continuous bank line. The rootwads are then covered with streambed and channel embankment fill. Erosion control fabric is placed on top of the fill and the area is planted.

6.6.1.2.2 Log Cribwalls. Log cribwalls are retaining walls constructed of stacked, interlocking logs; cribwalls constructed for the Project will also incorporate rootwads to provide instream fish habitat. In order to install a cribwall that employs both logs and rootwads as structural elements, the streambed and bank are excavated, and footer logs are placed and secured with a stream boulder anchor at each end. Seal logs are placed on top of the footer logs and secured to them with cables. The seal logs and rootwads are placed so that they form a continuous barrier for backfill; the rootwads are anchored with helical or concrete block anchors. The crib logs are placed on top of the rootwads, with abutted or overlapping ends so that they also form a continuous barrier. The area behind the cribwall is backfilled with soil, covered with erosion control fabric, and planted.

6.6.2 Sediment and Vegetation Removal

The District presently conducts limited channel maintenance activities on the reach of Guadalupe Creek between Camden Avenue and Coleman Road, which includes the project area. These activities include:

- removing large woody debris that impedes flood conveyance,
- removing accumulated sediment that reduces flood conveyance capacity,
- controlling vegetation under the Meridian Avenue and Almaden Expressway bridges as needed to maintain flow,

- *stabilizing eroding banks to protect existing infrastructure, and*
- controlling vegetation growth on upper floodplain terraces by mechanical (mowing) or chemical means to comply with local fire prevention ordinances.

Under the existing maintenance program, sediment removal activities are limited to key areas such as the Almaden Expressway Bridge; maintenance workers use existing access points in order to avoid adverse impacts on riparian vegetation. In addition, channel maintenance activities are conducted in compliance with RWQCB and DFG requirements and follow standard BMPs to avoid adverse impacts on water quality, vegetation, and fish and wildlife.

Implementation of the proposed project is not expected to result in any significant change in the District's maintenance activities in the project area, although it may slightly decrease the need for ongoing maintenance. The project is designed to stabilize existing areas of erosion and to decrease local sediment input to Guadalupe Creek. In addition, although the project will significantly increase the area and density of streamside vegetation on the project site, planting is not expected to reduce flood conveyance capacity; planting areas near the bridges have been tapered to reduce the potential for vegetation to obstruct flow or to trap sediment and waterborne debris.

After project implementation the District will continue to monitor the creek at key locations such as the Meridian Avenue and Almaden Expressway bridges to ensure that sediment does not *accumulate and impede flow. To minimize habitat disturbance and disruption of natural stream* processes, sediment will be allowed to accumulate as long as

- flow is not obstructed,
- the quality of anadromous fish habitat is not impaired, and
- the creek is not prevented from being "self-cleaning".

Typically, sediment will be removed when the accumulated depth of sediment exceeds 3 feet within the channel or 1.5 feet around bridges.

In addition, it may occasionally be necessary to remove vegetation around bridges or in the channel in order to maintain flow (see Table 1); hand or mechanical methods may be used. Maximum levels of instream vegetation and fallen debris will be allowed as long as flow is not impeded and the creek is not prevented from being "self-cleaning". Outside the designated riparian planting zones, it may be necessary to mow existing vegetation to comply with local fire control ordinances. In addition, it may be necessary to remove targeted invasive non-native plant species (Table 2). Early detection and removal of these species using hand, mechanical, or chemical methods will ensure that the targeted species do not become established.

6.6.3 Instream and Bank Protection Structure Maintenance

Because of the materials used to construct instream and bank protection structures, some deterioration is expected through time. These structures will be maintained as necessary. When maintenance can no longer restore effective function to a deteriorating structure, one of two measures will be taken.

- In areas where erosion no longer poses a threat, the bank stabilization or instream measures may be left in place; or
- where erosion control is still necessary, the structure may be replaced, either with in-kind materials or a with another appropriate stabilization measure.

Leaving the structure in place will avoid disturbance of stream processes and habitats; however, careful erosion monitoring will be essential if a deteriorating structure is left in place, and it may become necessary to remove the structure in the future. Deteriorating structures will be replaced where bank protection is still needed. Replacement sites will be evaluated on a case-by-case basis in order to select the most effective type of replacement measure.

To ensure timely maintenance and care of bank stabilization structures, the District will implement a strategy of early detection and correction. District Staff will inspect instream and bank protection structures for signs of deterioration at least three times per year and following major storm events. Early intervention will be incorporated as a project BMP to reduce potential impacts and creek disturbance related to the deterioration and replacement of bank protection..

Although the project will significantly increase the area and density of streamside vegetation on the project site, planting is not expected to reduce flood conveyance capacity and the project will not substantially change existing vegetation maintenance practices in the project area. As described in Chapter 5, vegetated areas near bridges are tapered to reduce the potential for vegetation to obstruct flow or to trap sediment and waterborne debris. This will minimize the need for maintenance adjacent to bridges. However, it may occasionally be necessary to remove vegetation around bridges or in the channel in order to maintain flow (see Table 6-1); hand or mechanical methods may be used. Maximum levels of instream vegetation and fallen debris will be allowed as long as flow is not impeded and the creek is not prevented from being "self-cleaning". Outside the designated riparian planting zones, it may be necessary to mow existing vegetation to comply with local fire control ordinances. In addition, it may be necessary to remove targeted invasive non-native plant species (Table 6-2). Early detection and removal of these species using hand, mechanical, or chemical methods will ensure that the targeted species do not become established.

6.6.3 Instream and Bank Protection Structure Maintenance

Because of the materials used to construct instream and bank protection structures, some deterioration is expected through time. These structures will be maintained as necessary. When maintenance can no longer restore effective function to a deteriorating structure, one of two measures will be taken.

- In areas where erosion no longer poses a threat, the bank stabilization or instream measures may be left in place; or
- where erosion control is still necessary, the structure may be replaced, either with in-kind materials or a with another appropriate stabilization measure.

Leaving the structure in place will avoid disturbance of stream processes and habitats; however, careful erosion monitoring will be essential if a deteriorating structure is left in place, and it may become necessary to remove the structure in the future. Deteriorating structures will be replaced where bank protection is still needed. Replacement sites will be evaluated on a case-by-case basis in order to select the most effective type of replacement measure.

If bank protection structures fail, debris may fall or be transported into the channel; inchannel debris poses a potential safety hazard to fish and wildlife and may damage structures downstream. In addition, remaining anchor cables may create a safety hazard on the bank. Maintenance activities will include the removal of inchannel debris and remaining anchor cabling in the event that bank protection structures fail.

To ensure timely maintenance and care of bank stabilization structures, the District will implement a strategy of early detection and correction. District Staff will inspect instream and bank protection structures for signs of deterioration at least three times per year and following major storm events. Early intervention will be incorporated as a project BMP to reduce potential impacts and creek disturbance related to the deterioration and replacement of bank protection.

Table 6-1. Maintenance Standards for Guadalupe Creek from Almaden Expressway to Masson Dam

Facility Type	Maintenance Issue	Acceptable Limit	Performance Criteria
Unmodified Channel	Sediment accumulation	Accumulated sediment is 3.0 feet deep.	Remove sediment from streambed.
	Woody vegetation	Woody vegetation occupies entire channel bottom.	Remove from entire channel bottom (from bank toe to bank toe), using hand labor or mechanical methods.
Planting Corridor	Invasive non-native vegetation	Individuals of targeted species are present.	Remove by hand, mechanical, or chemical methods.
Bridges	Sediment accumulation	Accumulated sediment is 1.5 feet deep.	Remove sediment.
	Vegetation growth under structure	Vegetation is more than 5 feet tall.	Remove, using hand labor or mechanical methods

Instream and Bank Protection Structures	Deterioration of structure	Deterioration cannot be restored.	In key bank protection areas, replace structure with appropriate protection method. Where bank protection is no longer needed, leave structure in place but do not repair.
	Structure deteriorated or partially lost	Remaining parts pose safety hazard to fish and wildlife and/or detrimentally impede flow.	In key bank protection areas, replace missing parts of structure immediately; elsewhere, remove remaining parts of structure immediately.
All	Vegetation on roads	Vegetation is present.	Remove from road, using mechanical or chemical means.
	Vegetation overhanging roads	Vegetation is present.	Cut back overhanging vegetation at least 3 feet from edge of road.
	Vegetation obstructing flow	Vegetation is present.	Remove fallen trees and debris.

Table 6-2. Invasive Non-Native Plant Species Targeted for Removal at Guadalupe Creek Restoration Project Site

Botanical Name	Common Name
Arundo donax	Giant reed
Centaurea solstitialis	Yellow star-thistle
Convolvulus arvensis	Field bindweed
Cynodon dactylon	Bermuda grass
Delairea odorata	Cape ivy
Ditrichia graveolens	Stinkweed
Festuca arundinacea	Tall fescue
Lepidium latifolium	Perennial pepperweed
Picris echioides	Bristly ox-tongue

Chapter 7. Project Cost, Funding, and Schedule

7.1 COST

The estimated project cost for the Guadalupe Creek Restoration Project is $8.5 million. There are no anticipated Right-of-Way acquisition costs. Estimated quantities and order-of-magnitude costs for the recommended project are provided in Table 7-1.

7.2 FUNDING

The recommended project would be funded with existing District revenues on reserve central zone. The Corps, Sacramento District would fund an amount up to $5,000,000 under Section 215 of Public Law 90-483 agreement.

7.3 SCHEDULE

Advertising for bids is expected to begin in April 2000. Contract award is anticipated in early June 2001. Construction is scheduled to begin in June 2001 with an expected completion date of December 2001.

Table 7-1. Construction Cost Estimate for the Recommended Project

Item No.	Description of Bid Item	Approximate Quantity	Unit	Unit Price	Total
1	Storm Water Pollution Prevention Plan	1	Lump Sum	$50,000.00	$50,000
2	Mobilization /Demobilization	1	Lump Sum	$130,000.00	$130,000
3	Preservation Fencing	20,000	Linear Foot	$5.00	$100,000
4	Individual Plant Removal	1	Lump Sum	$30,000.00	$30,000
5	Cluster Plant Removal	91,000	Square Foot	$0.50	$45,500
6	Existing Tree Excavation for Transplanting	152	Each	$850.00	$129,200
7	Existing Tree Excavation for Reuse as Instream Woody Material	2	Each	$1,000.00	$2,000
8	Asphaltic Concrete Removal	1	Lump Sum	$3,000.00	$3,000
9	Existing Concrete Slope Protection Removal	24	Ton	$100.00	$2,400
10	Control of Water (Coordination with District)	1	Lump Sum	$15,000.00	$15,000
11	Channel Excavation	17,000	Ton	$6.00	$102,000
12	Bank and Bench Excavation	71,000	Ton	$3.00	$213,000
13	Instream Structure Excavation	7,000	Ton	$9.00	$63,000
14	Type 3 Boulder Removal and Salvage	200	Each	$30.00	$6,000
15	Soil Disposal	46,200	Ton	$16.50	$762,300
16	Toxic Constituent Disposal	38,000	Ton	$65.00	$2,470,000
17	Soil Loosening	300,000	Square Foot	$0.04	$12,000
18	Channel Embankment Construction	5,000	Ton	$30.00	$150,000
19	Bench Construction	3,700	Ton	$35.00	$129,500
20	Streambed Construction	7,300	Ton	$36.00	$262,800
21	Bar Construction	5,000	Square Foot	$3.00	$15,000
22	Topsoil Fill	6,000	Ton	$18.00	$108,000
23	Bank Protection	750	Linear Foot	$270.00	$202,500
24	Rock Slope Protection	100	Ton	$45.00	$4,500
25	Percolation Pond Construction	1	Lump Sum	$250,000.00	$250,000
26	Infrastructure Modifications	1	Lump Sum	$50,000.00	$50,000
27	Stream Boulder Placement	150	Each	$35.00	$5,250
28	Cross Weir	15	Each	$5,000.00	$75,000
29	V-Weirs	10	Each	$4,500.00	$45,000

30	Wing Deflector	4	Each	$1,500.00	$6,000
31	Log Stream Barb	30	Each	$1,400.00	$42,000
32	Rock Stream Barbs	24	Each	$2,200.00	$52,800
33	Waters Edge Treatment	3,000	Linear Foot	$20.00	$60,000
34	Buried Groins	335	Ton	$75.00	$25,125
35	Rootwad Bank Structure - Type 1	71	Each	$2,800.00	$198,800
36	Rootwad Bank Structure - Type 2	9	Each	$2,700.00	$24,300
37	Bar IWM	150	Each	$850.00	$127,500
38	Stream IWM	9	Each	$800.00	$7,200
39	Overbank Woody Material	12	Each	$2,300.00	$27,600
40	Log Toe Bank Structure	18	Each	$2,000.00	$36,000
41	Off-bank Branch Cover	45	Each	$800.00	$36,000
42	Off-bank Log Cover	8	Each	$800.00	$6,400
43	Remove, Salvage, and Reinstall Chain Link Fence	800	Linear Foot	$20.00	$16,000
44	Chain Link Fence	120	Linear Foot	$25.00	$3,000
45	Water Service Point	2	Each	$20,000.00	$40,000
46	Meter	2	Each	$5,000.00	$10,000
47	Backflow Assembly	2	Each	$8,000.00	$16,000
48	Main Line	18,000	Linear Foot	$12.00	$216,000
49	Bubbler Irrigation System	300,000	Square Foot	$1.50	$450,000
50	Supplemental Watering (Construction Period)	4	Per Event	$5,000.00	$20,000
51	Type 1 Cutting Collection and Storage	3,715	Each	$5.00	$18,575
52	Type 2 Cutting Collection and Storage	2,023	Each	$5.00	$10,115
53	Type 1 Cutting Installation	3,715	Each	$12.00	$44,580
54	Type 2 Cutting Installation on Bench	445	Each	$15.00	$6,675
55	Type 2 Cutting Installation on Slope	772	Each	$15.00	$11,580
56	Type 2 Cutting Installation on Bank	806	Each	$12.00	$9,672
57	Brush Layer Collection and Storage	100	Each	$20.00	$2,000
58	Brush Layer Installation	100	Each	$50.00	$5,000
59	Willow Wattles (20-foot lengths)	20	Each	$2,500.00	$50,000
60	Container Plant Installation on Bench	5,122	Each	$15.00	$76,830

61	Container Plant Installation on Slope	3,895	Each	$15.00	$58,425
62	Container Plant Installation on Bank	1,297	Each	$15.00	$19,455
63	Acorn Planting	206	Each	$12.00	$2,472
64	Transplanting	152	Each	$1,000.00	$152,000
65	Seeding	20	Acre	$2,000.00	$40,000
66	Weed Control (3-year Maintenance Period)	12	Month	$5,000.00	$60,000
67	Irrigation Operation (3-yearMaintenance Period)	21	Month	$1,200.00	$25,200
68	Supplemental Watering (3-yearMaintenance Period)	18	Per Event	$5,000.00	$90,000
69	Replacement Planting (3-yearMaintenance Period)	5500	Each	$25.00	$137,500
70	Reseeding (Maintenance Period)	275,000	Square Foot	$0.05	$13,750
71	Plant Establishment Forms	36	Each	$500.00	$18,000
72	Record Drawings	1	Set	$15,000.00	$15,000
Subtotal					$7,720,500
Quantity and Unit Cost Contingency					$772,050
Total Estimated Cost					**$8,492,550**

Notes:

This cost estimate is based on the Draft Submittal Construction Documents (i.e., plans & specifications) prepared by Jones & Stokes and Northwest Hydraulic Consultants, dated July 19, 2000, and conceptual changes developed for the recommended project based on comments received form District staff.

This cost estimate does not include subsequent phases of the project.

This cost estimate is a planning tool to assess the level of effort required to perform the work. This estimate is preliminary, and actual costs may vary by an order of magnitude. Actual construction costs may vary from the above estimates because of competitive bidding, negotiations with the Santa Clara Valley Water District, or fluctuations in market prices. This estimate is not a bid.

Total costs have been rounded off for order-of-magnitude purposes.

This estimate does not include contingencies for soil disposal and soil management relating to hazardous materials that may be found onsite. Based on existing data, this estimate assumes that 40% of the material will be disposed of at a Class II or Class III facility.

This estimate assumes that the District will be responsible for control of water, including dewatering the creek and rerouting flows through the Los Capitancillos percolation pond system.

Chapter 8. Conclusions and Recommendations

The Santa Clara Valley Water District (District) is proposing to establish approximately 13,000 linear feet (lf) of shaded riverine aquatic (SRA) cover vegetation and improve aquatic habitat in the lower reaches of Guadalupe Creek between Almaden Expressway and Masson Dam. The Guadalupe Creek Restoration Project (Project) is intended to provide SRA mitigation to offset environmental impacts associated with future District projects.

The Guadalupe Creek Restoration Project would provide shaded riverine aquatic cover vegetation and fisheries enhancements. The following are the beneficial impacts of the Project.

- **Fisheries:** Restores SRA cover vegetation and improves aquatic habitat, creating and maintaining suitable water temperatures, increases organic material (e.g., leaf and insect drop), and provides habitat to support all life stages of anadromous fish.
- **Wildlife:** Restores ecological functions and enhances habitat for special-status fish and wildlife species, as consistent with other Project objectives. Also restores vegetation in a reach of the creek that had previously been denuded.
- **Geomorphology:** Restores physical processes and ecological functions along the Project reach of Guadalupe Creek.
- **Public works:** Protects existing infrastructure in the Project area.
- **Public works:** Maintains existing flood conveyance capacity.
- **Recreation:** Project does not preclude future recreation uses that are compatible with other Project objectives.
- **Environmental Health:** The Project does not adversely effect environmental health within the Project area.

Therefore, it is recommended that the recommended project, which would establish approximately 13,000 lf of SRA, be approved and construction plans be prepared for implementation of the Project.

Chapter 9. Citations

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9.2 PERSONAL COMMUNICATIONS

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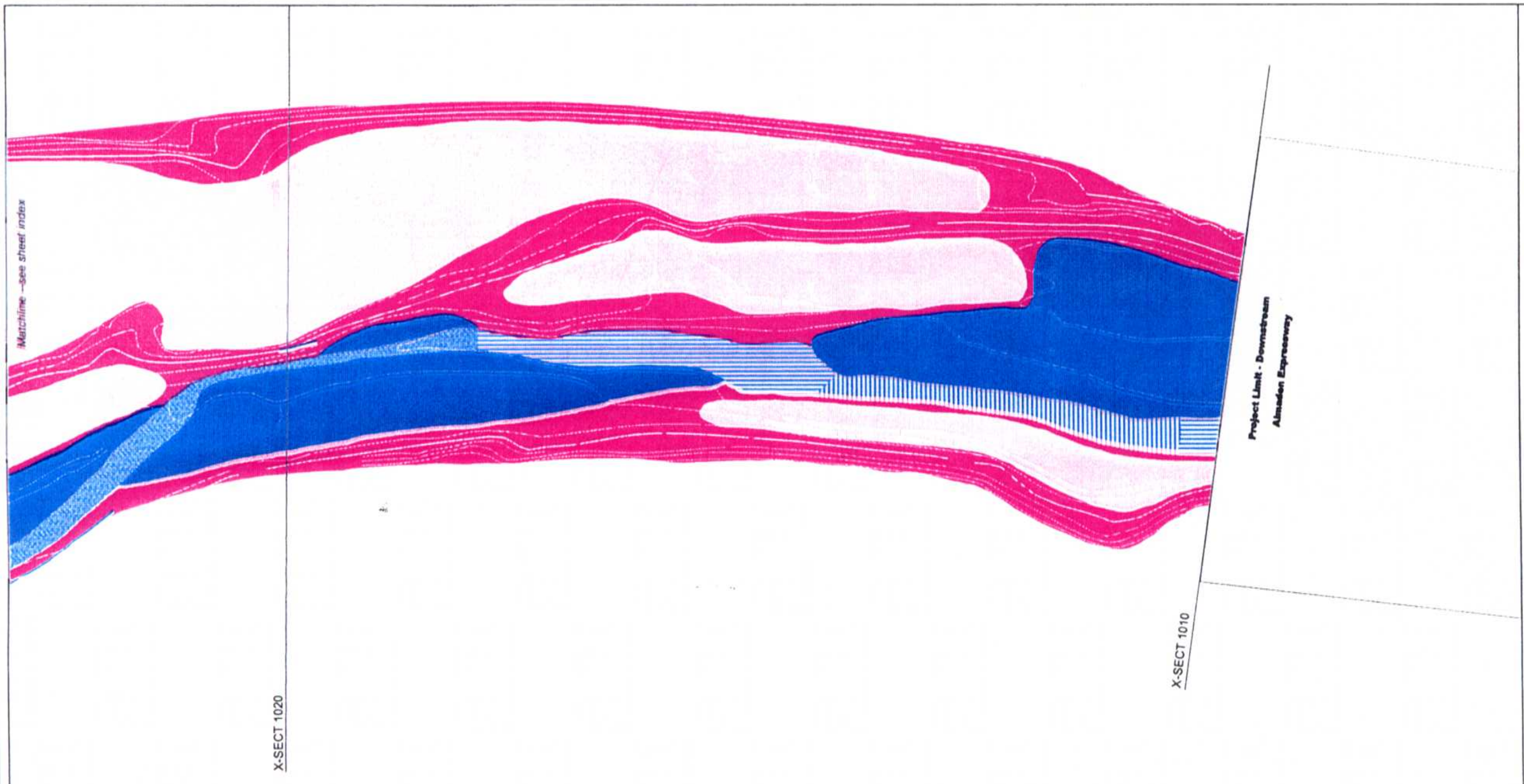
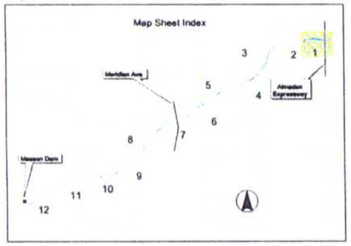
Martini, Ed. Vector technician. Santa Clara County Vector Control District, March 29, 2000 - telephone conversation.

Rieller, Kenn. Assistant associate engineer. Santa Clara Valley Water District, San Jose, CA. January 4, 1999 - meeting.

Appendix A. Baseline Condition Maps





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2. Data digitized by Jones & Stokes using AutoCAD Map V. 14.
3. Refer to text documentation for collection methodology and summaries.
4. See map sheet index for adjoining sheets.

20 0 20 40 60
Scale in feet

Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

Low Flow Channel (November 1999)
🟦 Bar
🟥 Slope
Bench
🟪 Bank Protection
▨ Berm

Undercut Bank
Bank Erosion

Pool
Riffle
Run

IWM Instream Woody Material

X-SECT 1080 Cross section

Index Contour (5' Interval)
Contour (1' Interval)

Jones & Stokes
nhc northwest hydraulic consultants

Geomorphic and Fisheries Habitat

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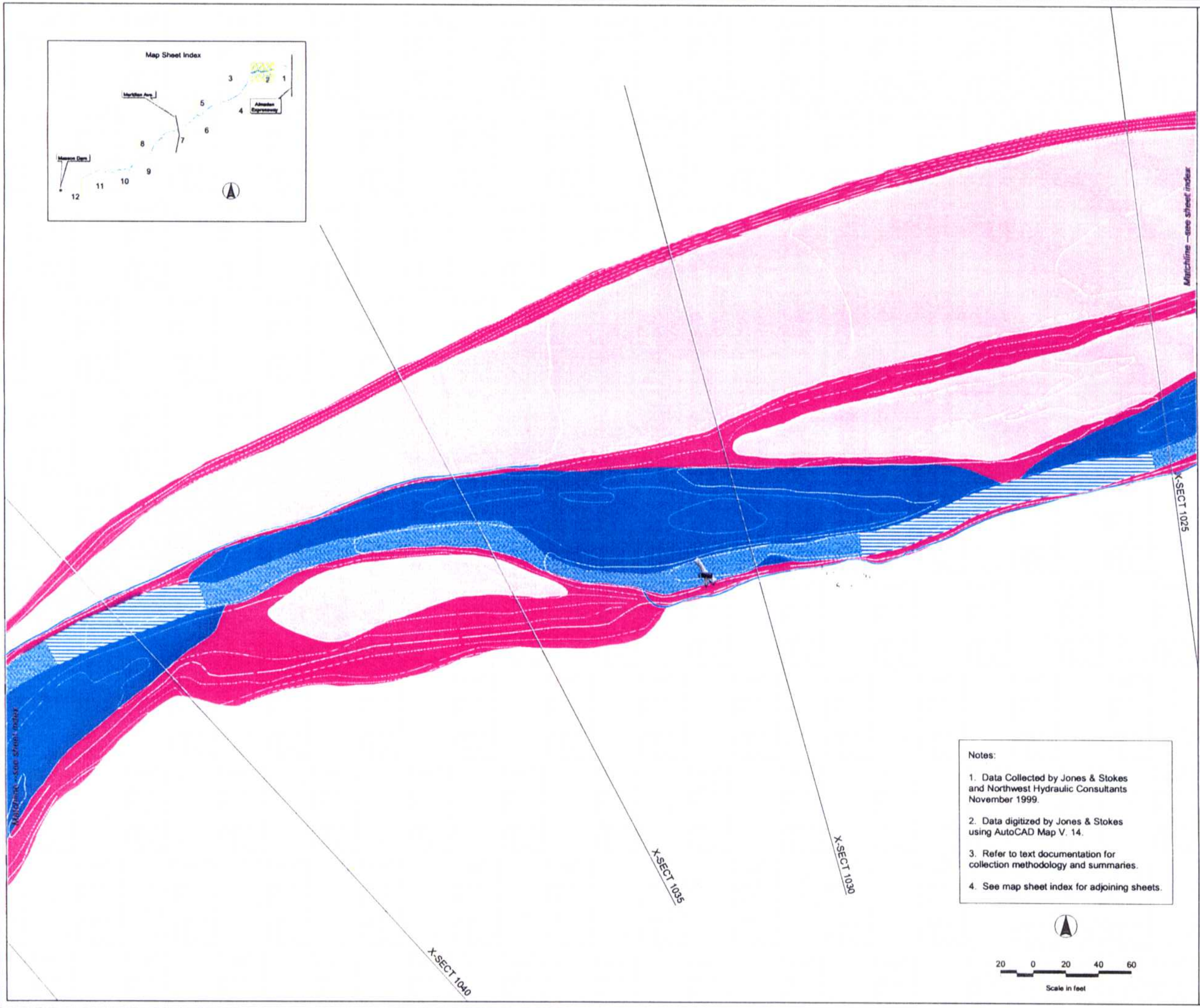

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

- Low Flow Channel (November 1999)
- 🟦 Bar
- 🟥 Slope
- Bench
- 🟪 Bank Protection
- ▨ Berm
- Undercut Bank
- Bank Erosion
- Pool
- Riffle
- Run
- IWM Instream Woody Material
- X-SECT 1080 Cross section
- Index Contour (5' Interval)
- Contour (1' Interval)

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Geomorphic and Fisheries Habitat

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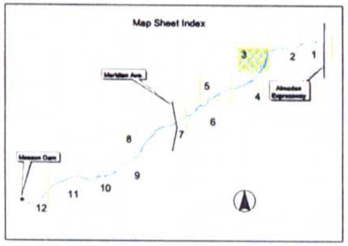
Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map



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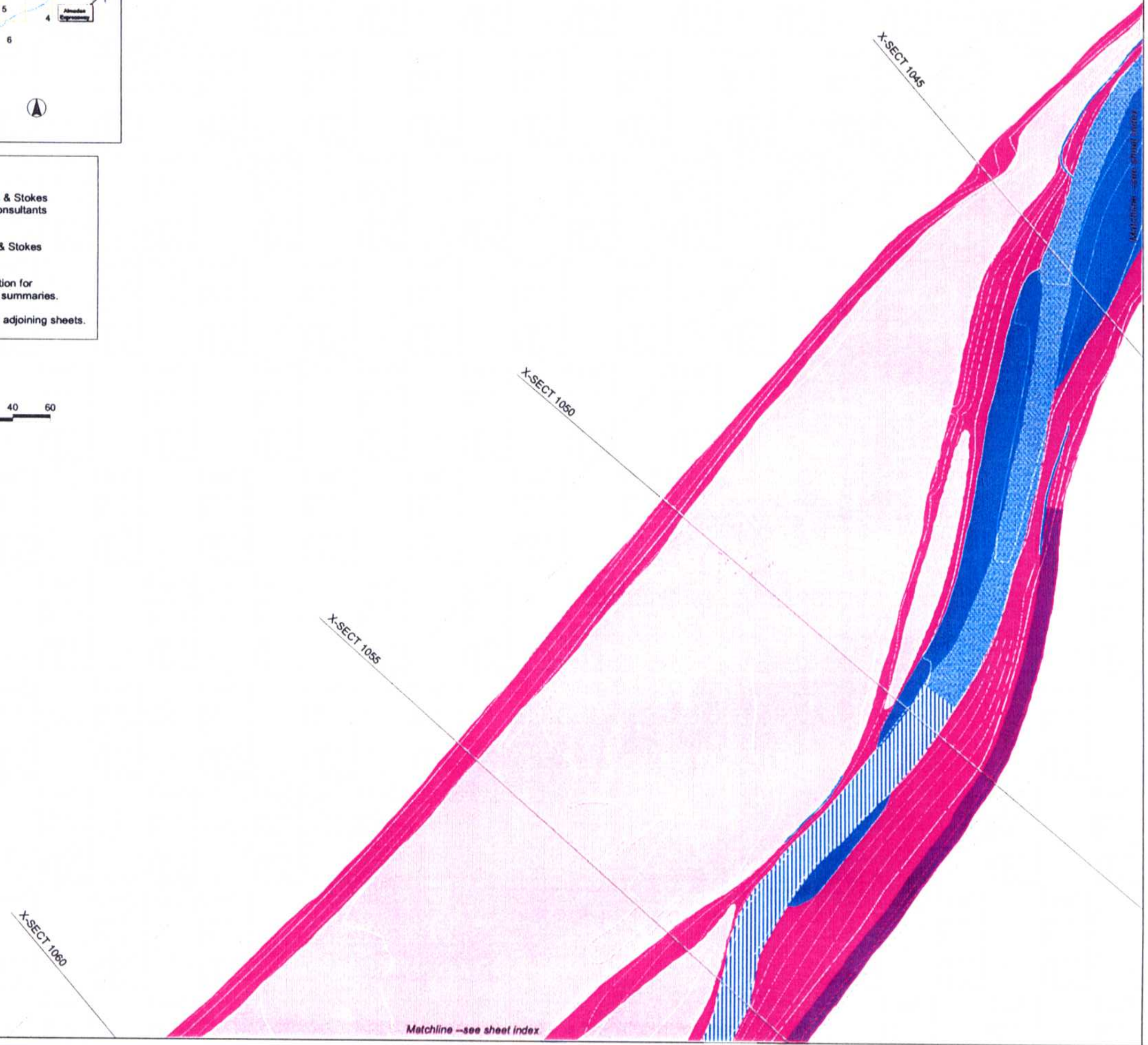

Legend

Low Flow Channel (November 1999)
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- Bench
- 🟪 Bank Protection
- ▨ Berm

- ∧/ Undercut Bank
- ∧/ Bank Erosion

- ≡ Pool
- ▦ Riffle
- ||||| Run

- IWM Instream Woody Material

X-SECT 1080 Cross section

Index Contour (5' Interval)
Contour (1' Interval)

Jones & Stokes

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Geomorphic and Fisheries Habitat

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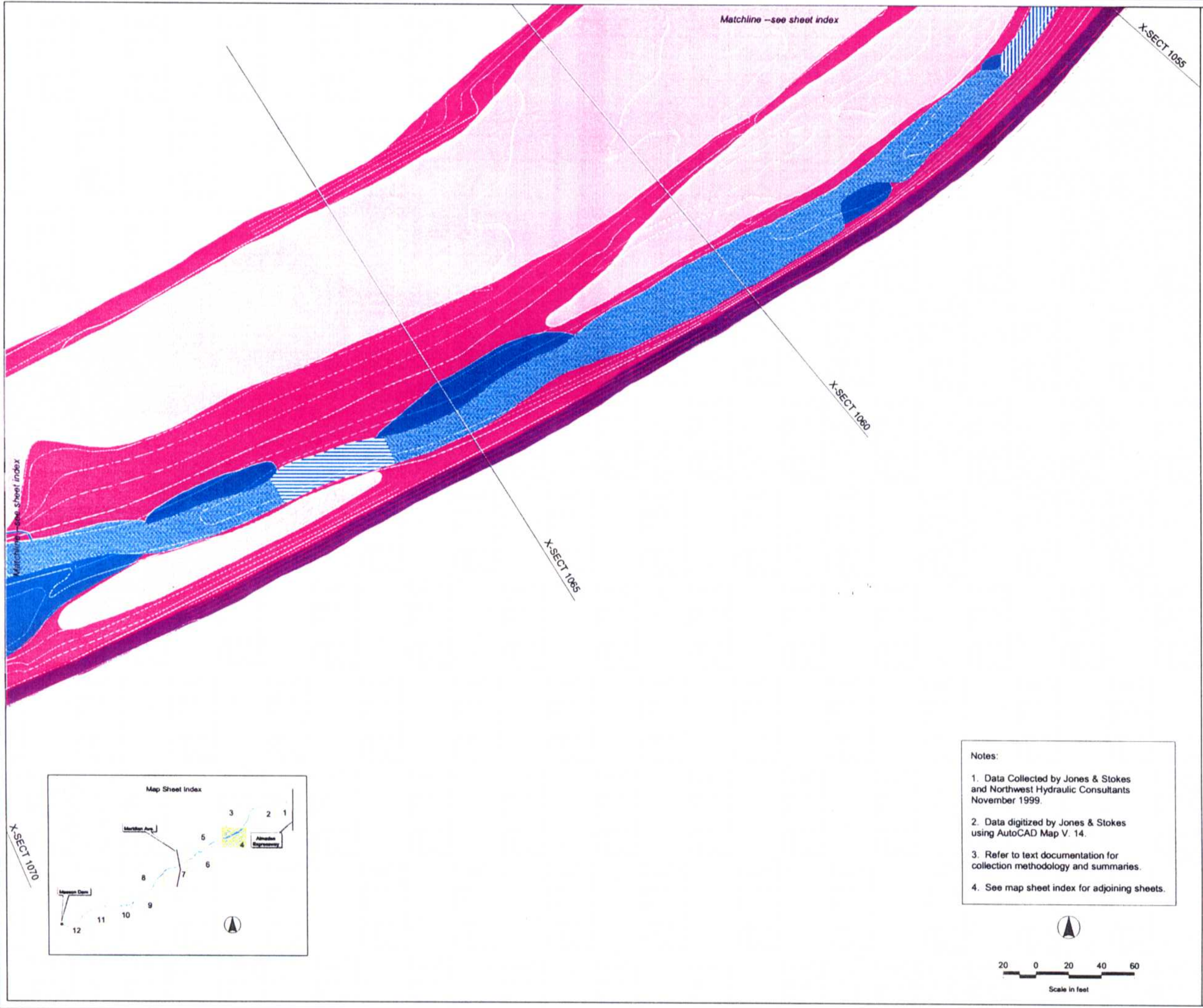

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

- ▨ Low Flow Channel (November 1999)
- ■ Bar
- ■ Slope
- ■ Bench
- ■ Bank Protection
- ▨ Berm
- ∧∕ Undercut Bank
- ∧∕ Bank Erosion
- ☰ Pool
- ▩ Riffle
- |||| Run
- IWM Instream Woody Material
- X-SECT 1080 Cross section
- Index Contour (5' Interval)
- Contour (1' Interval)

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Geomorphic and Fisheries Habitat

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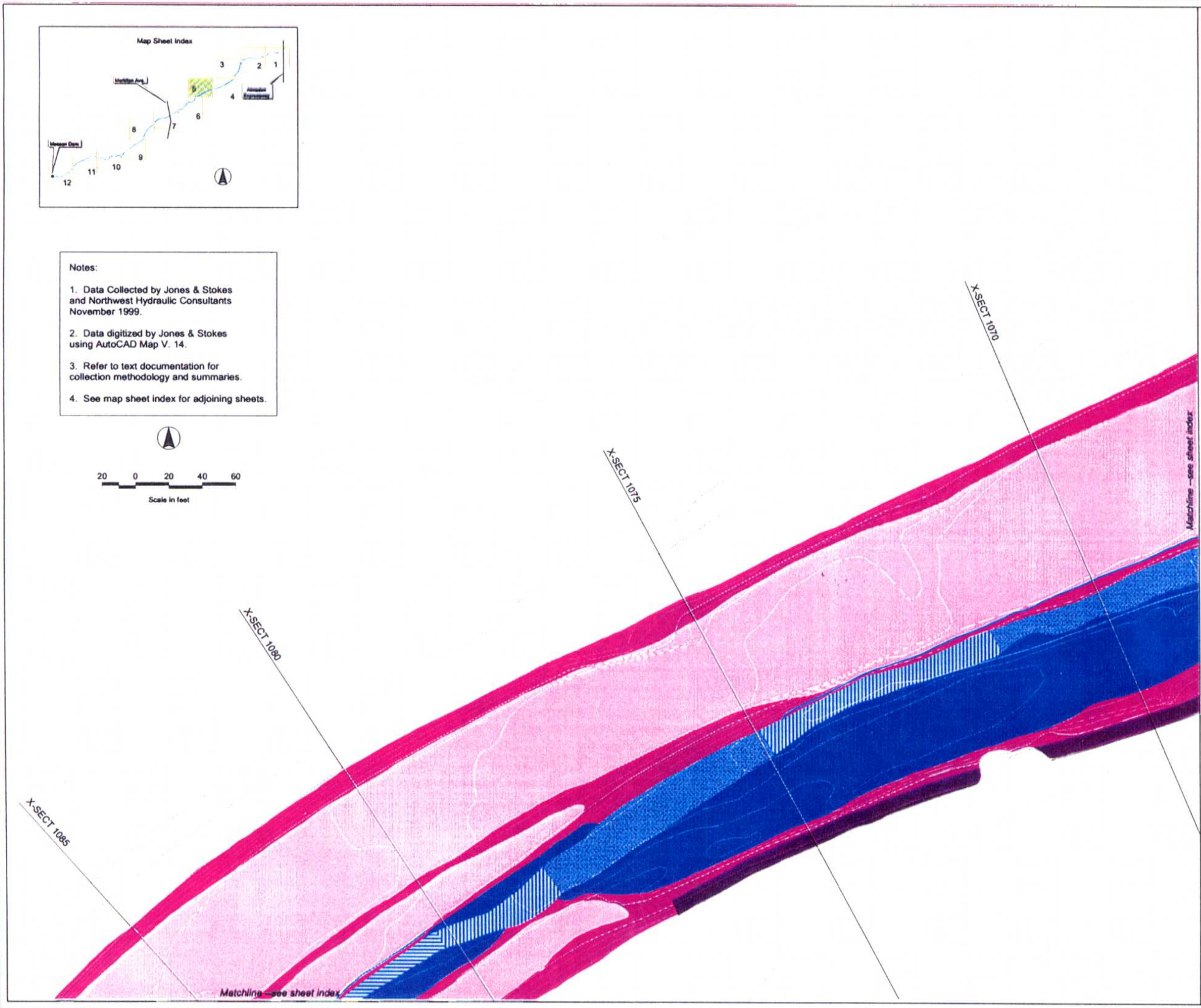

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

▤ Low Flow Channel (November 1999)
■ Bar
■ Slope
▤ Bench
■ Bank Protection
▨ Berm

∧∨ Undercut Bank
∧∨ Bank Erosion

☰ Pool
▦ Riffle
⦀ Run

▬ Instream Woody Material

X-SECT 1080 Cross section

Index Contour (5' Interval)
Contour (1' Interval)

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Geomorphic and Fisheries Habitat

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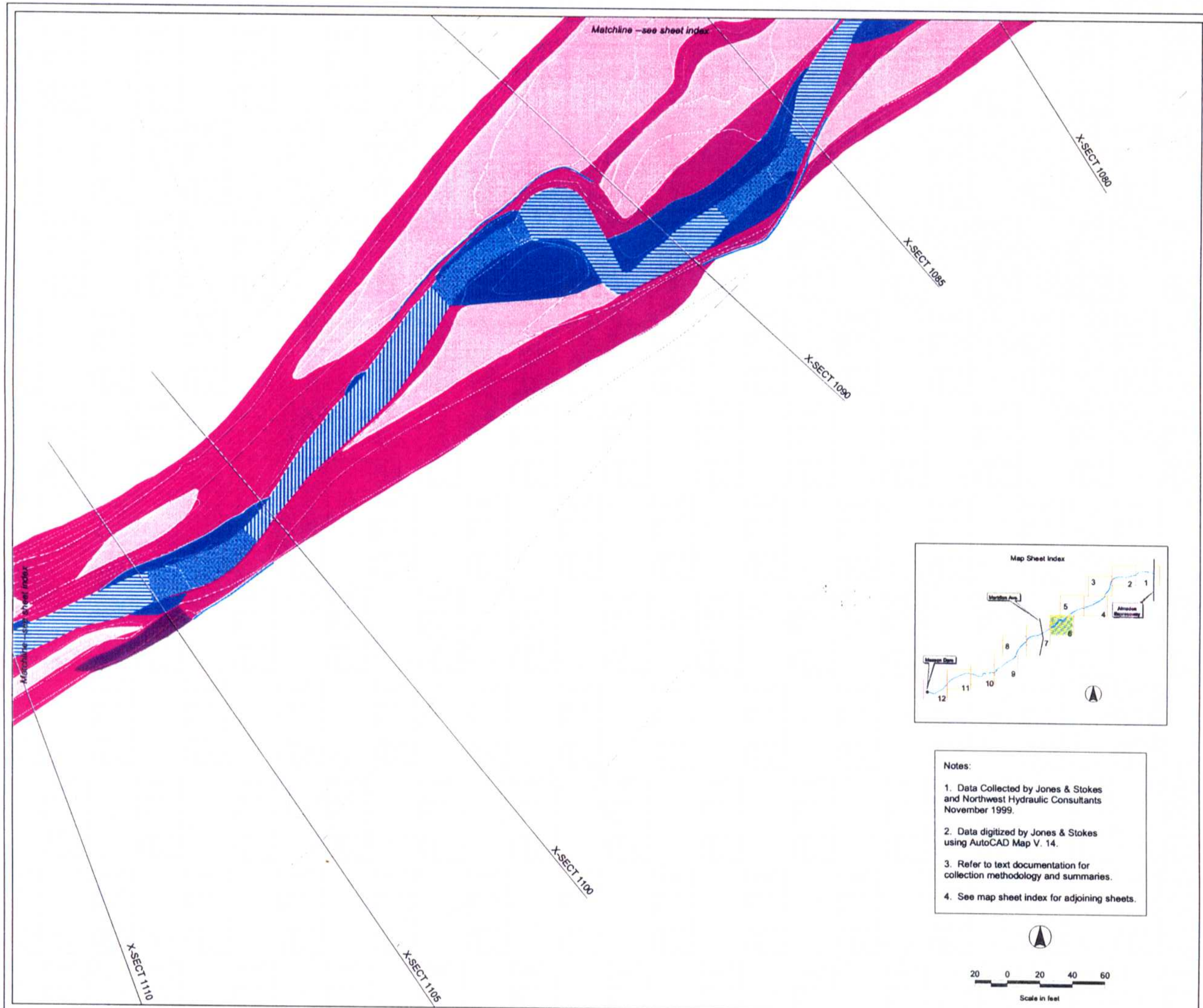

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

▨ Low Flow Channel (November 1999)
■ Bar
■ Slope
▨ Bench
■ Bank Protection
▨ Berm

∧∨ Undercut Bank
∧∨ Bank Erosion

☰ Pool
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▨ Instream Woody Material

X-SECT 1080 Cross section

Index Contour (5' Interval)
Contour (1' Interval)

Jones & Stokes

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Geomorphic and Fisheries Habitat

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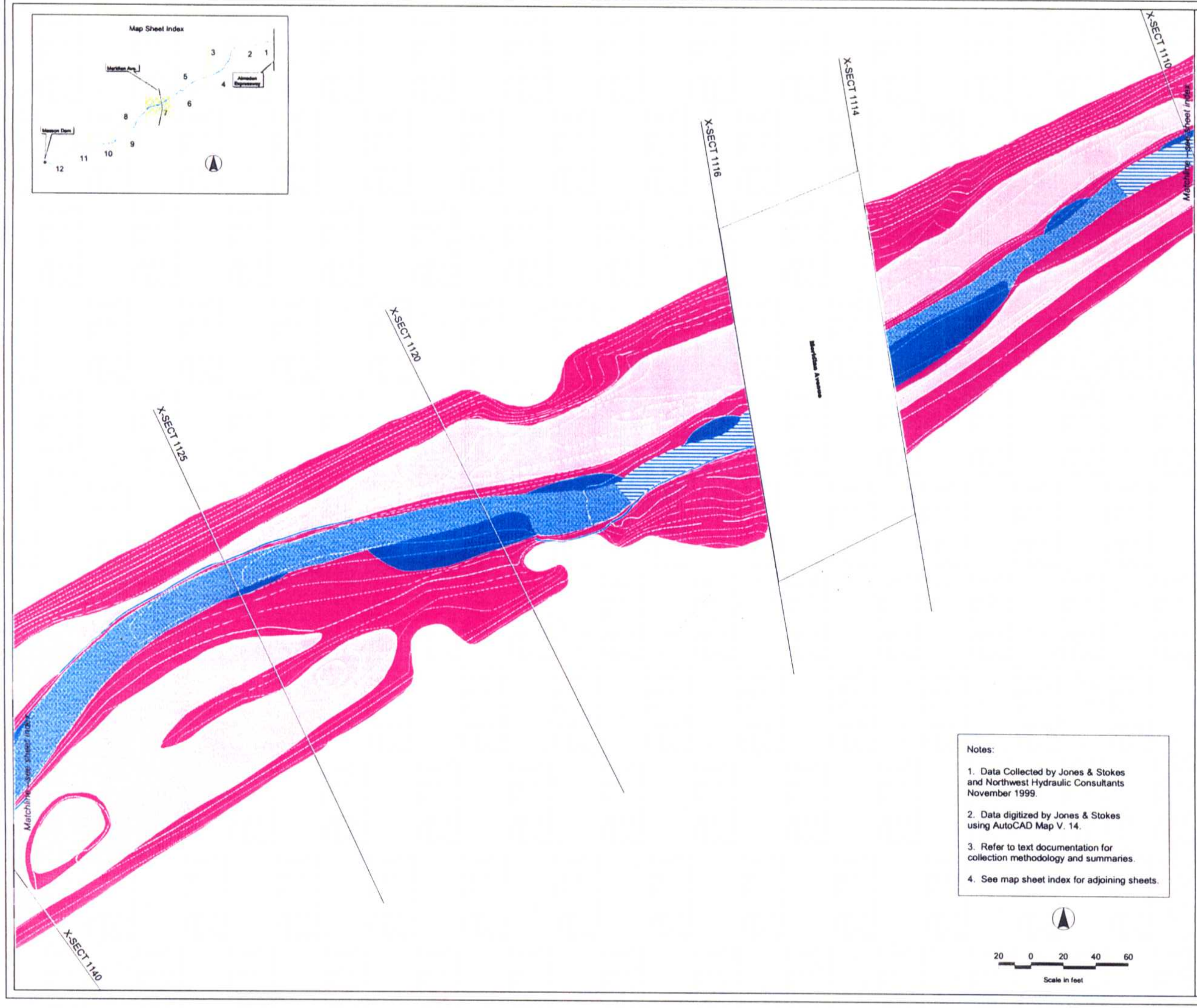

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

▨	Low Flow Channel (November 1999)
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▨	Bench
▨	Bank Protection
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∧	Undercut Bank
∧	Bank Erosion
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▨	Run
IWM	Instream Woody Material
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Jones & Stokes

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Geomorphic and Fisheries Habitat

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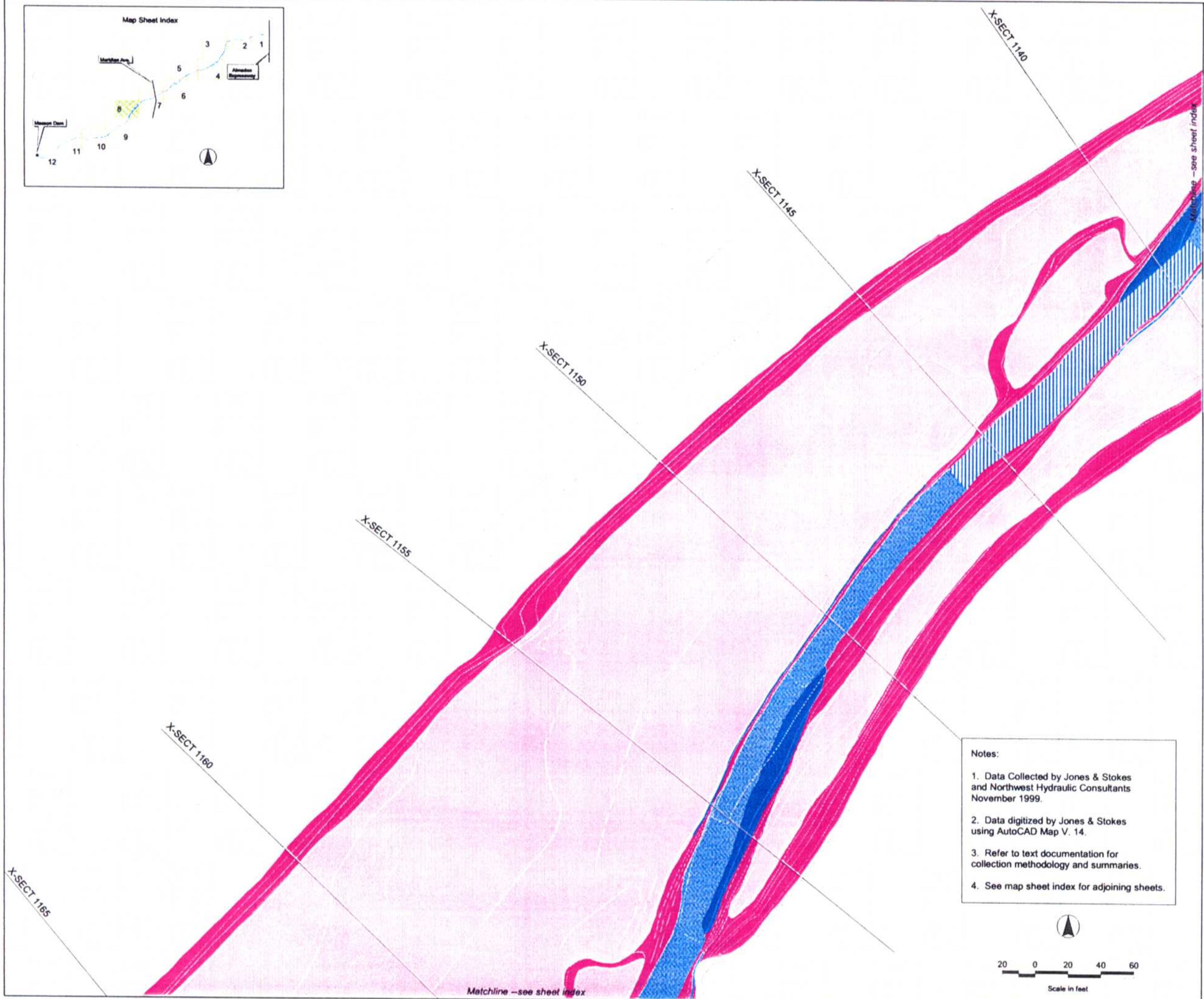

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

Low Flow Channel (November 1999)
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IWM Instream Woody Material

X-SECT 1080 Cross section

Index Contour (5' Interval)
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Jones & Stokes
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Geomorphic and Fisheries Habitat
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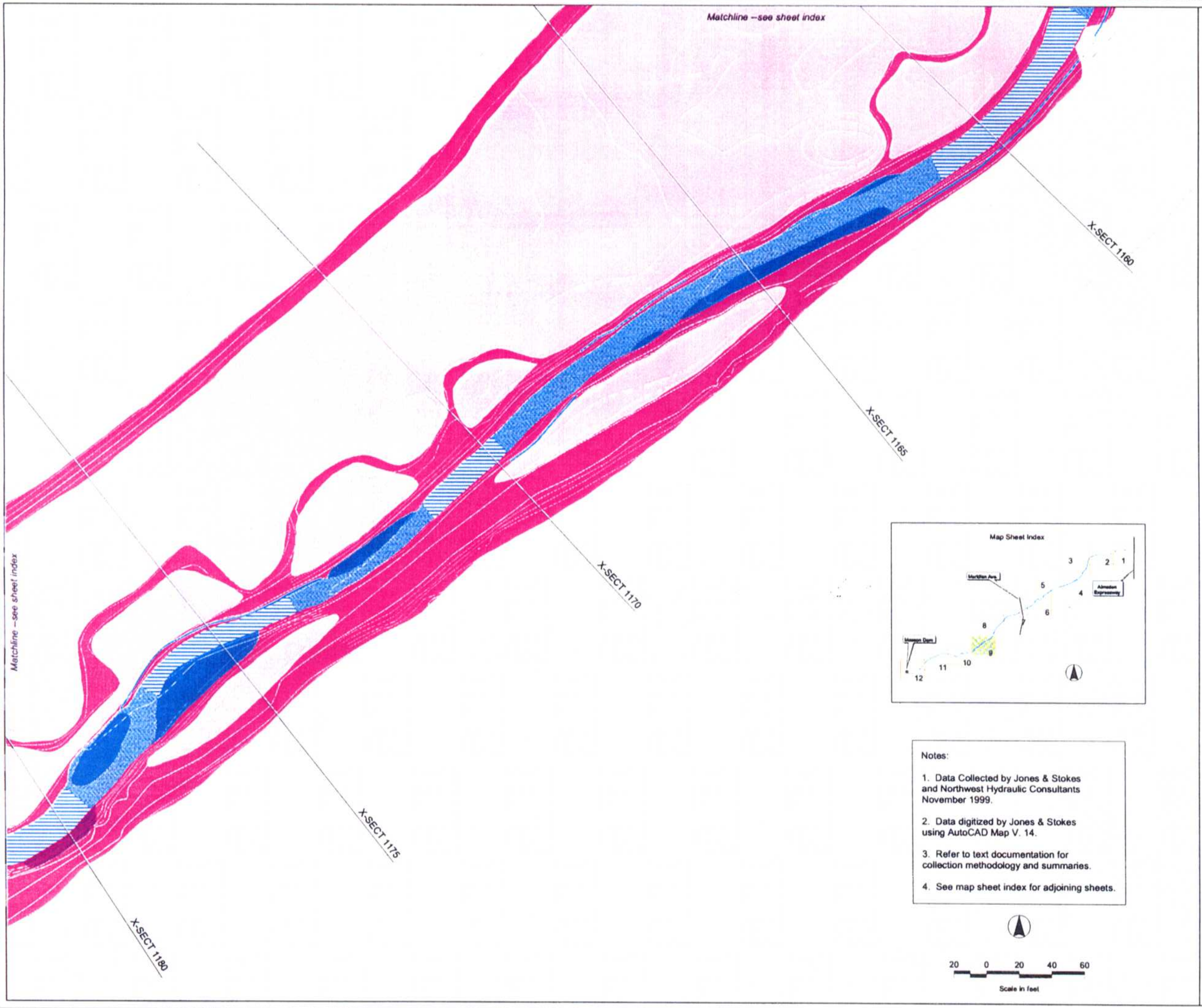

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

- Low Flow Channel (November 1999)
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- Undercut Bank
- Bank Erosion
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- Instream Woody Material
- X-SECT 1080 Cross section
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Geomorphic and Fisheries Habitat

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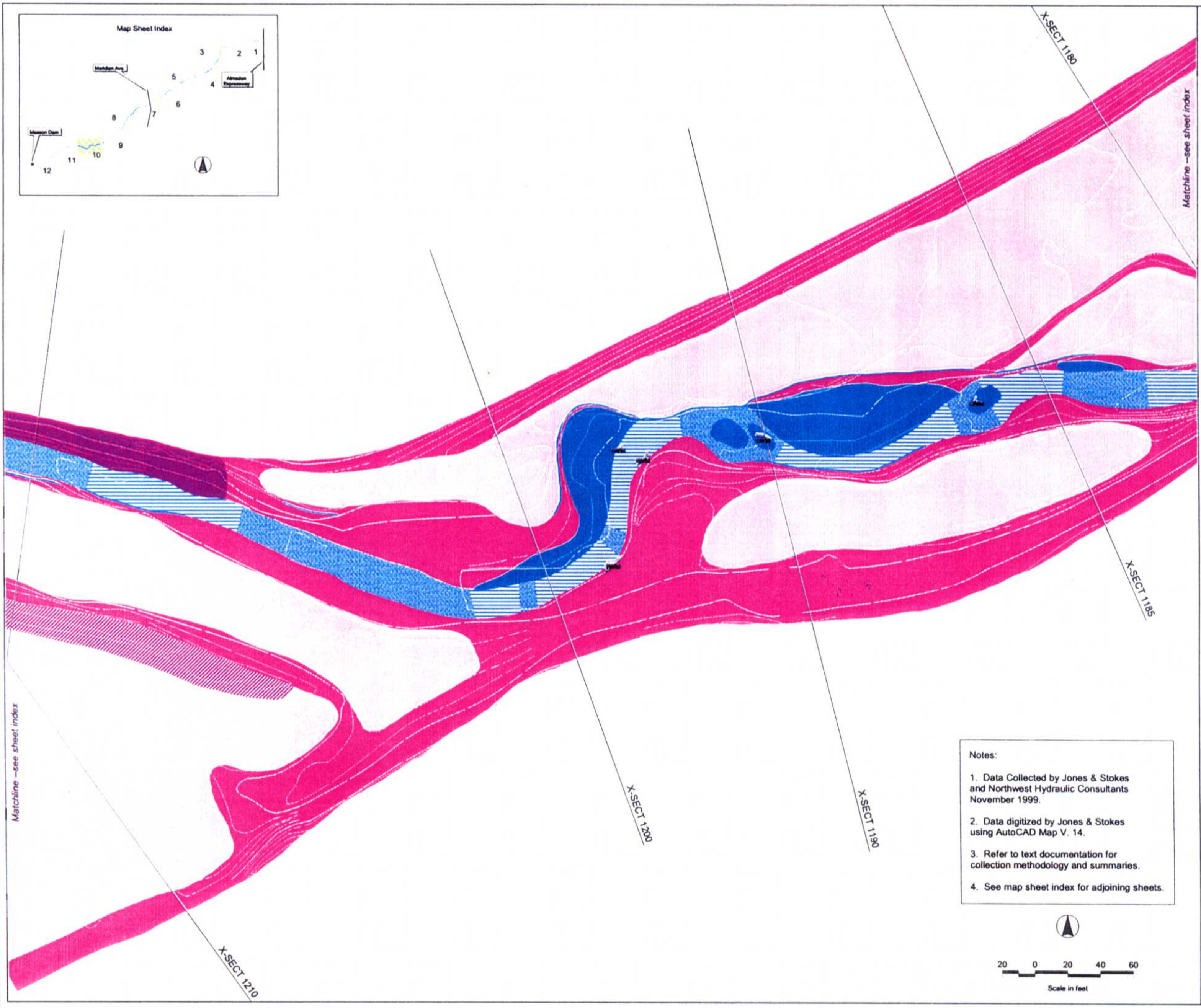

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

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Geomorphic and Fisheries Habitat

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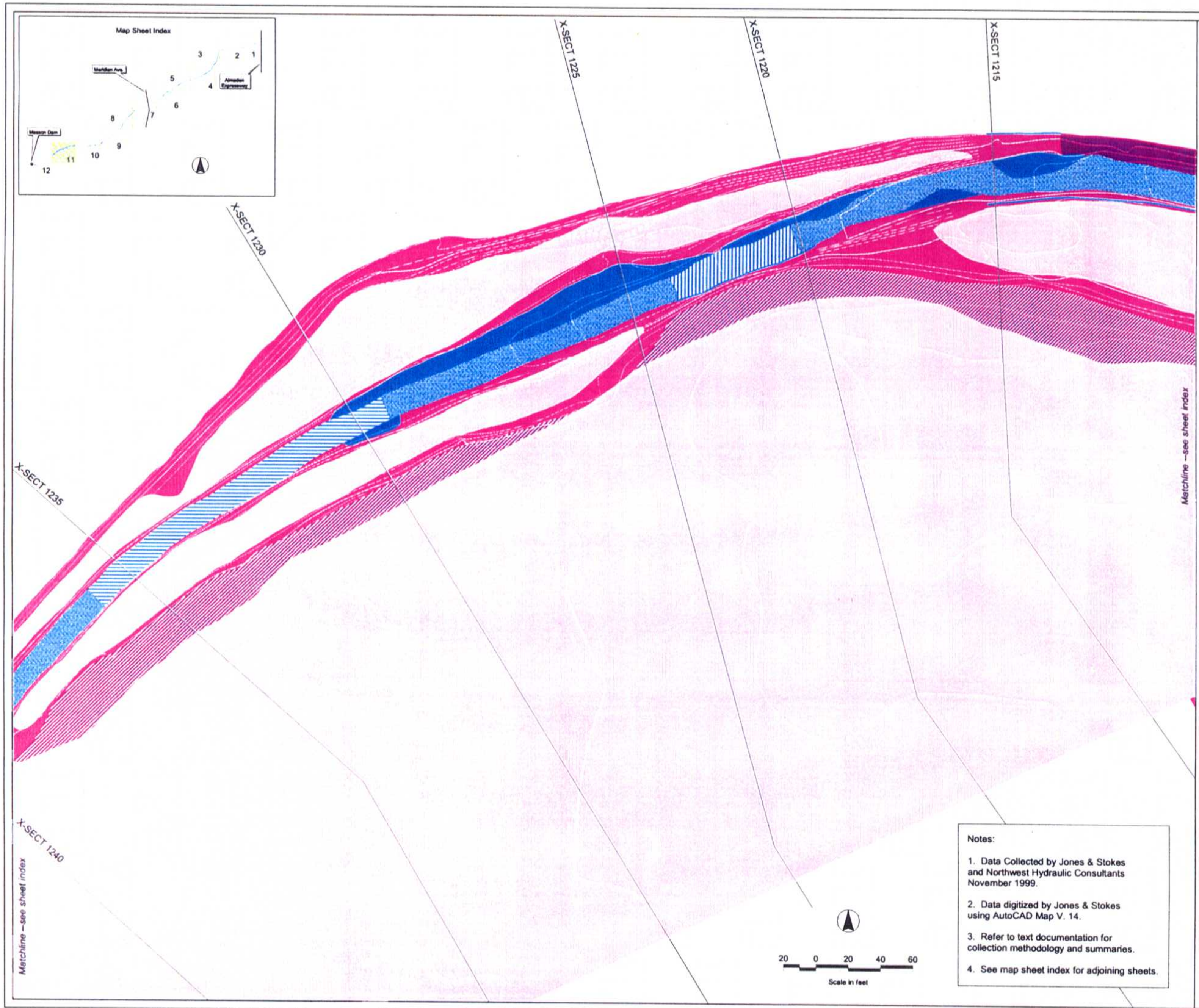

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

Low Flow Channel (November 1999)
🟦 Bar
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Bench
🟪 Bank Protection
▨ Berm

Undercut Bank
Bank Erosion

Pool
Riffle
Run

Instream Woody Material

X-SECT 1080 Cross section

Index Contour (5' Interval)
Contour (1' Interval)

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Geomorphic and Fisheries Habitat

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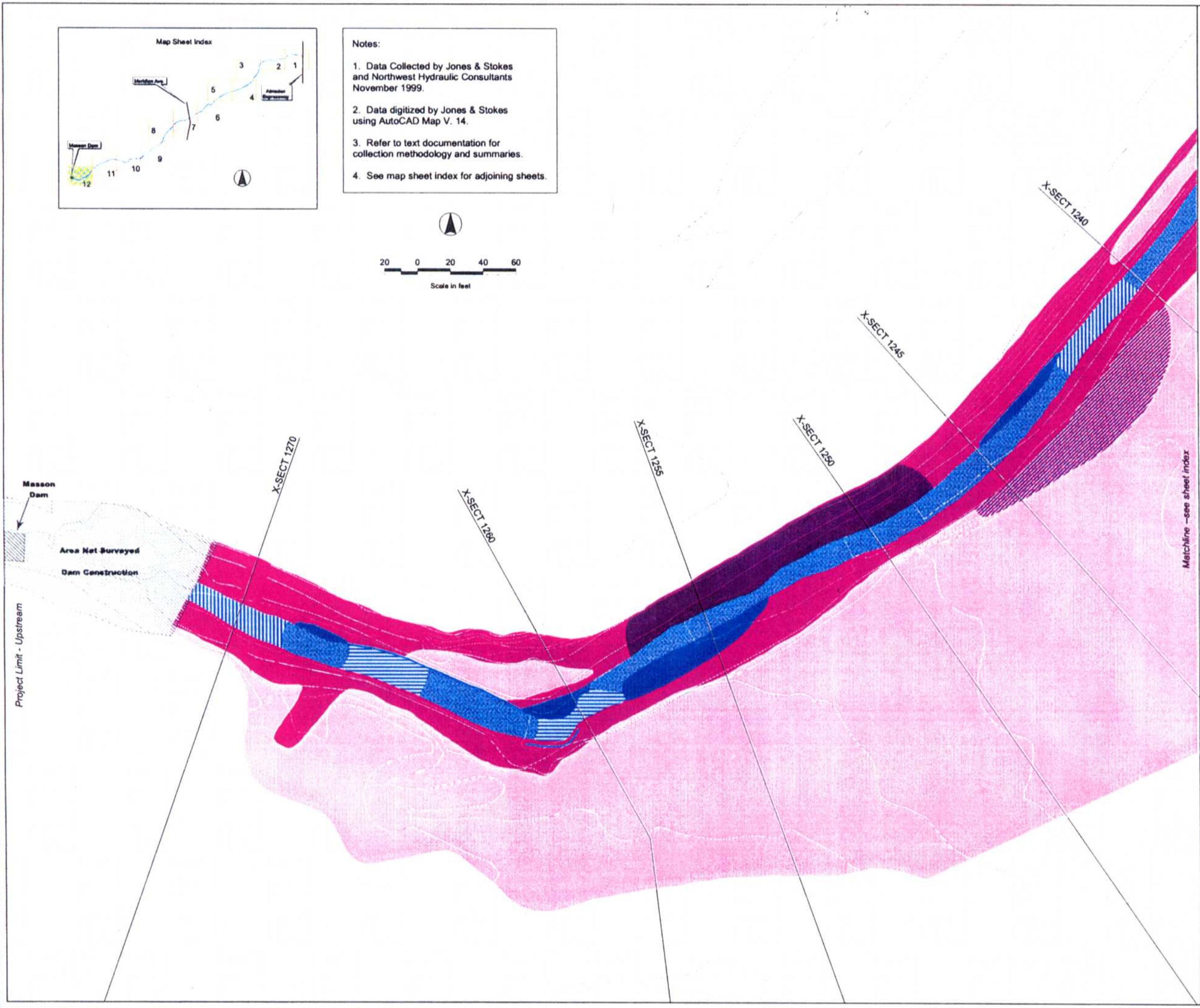

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Geomorphic and Fisheries Habitat Map

Legend

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▬ Instream Woody Material

X-SECT 1080 Cross section

Index Contour (5' Interval)
Contour (1' Interval)

Jones & Stokes
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Geomorphic and Fisheries Habitat
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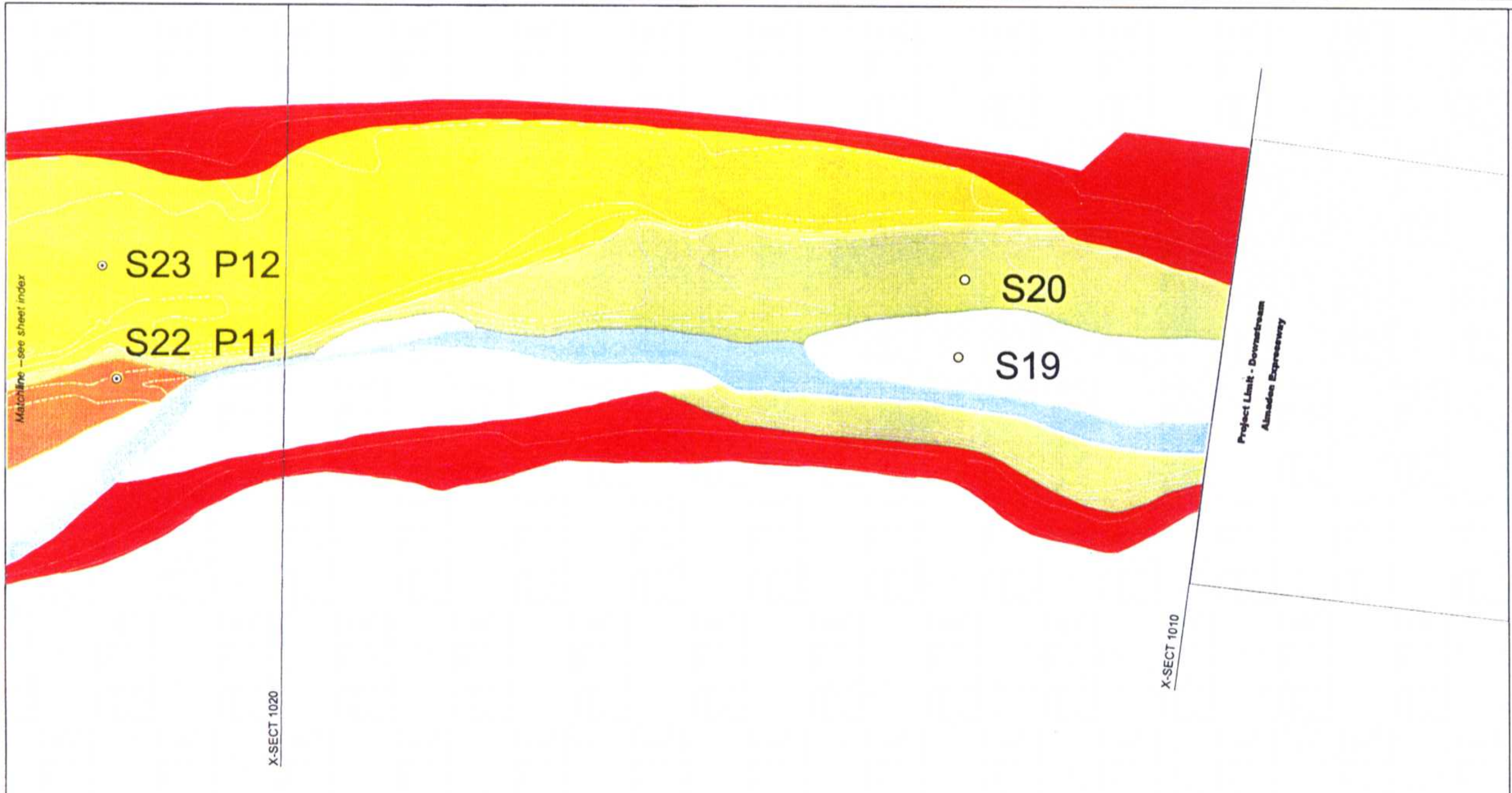

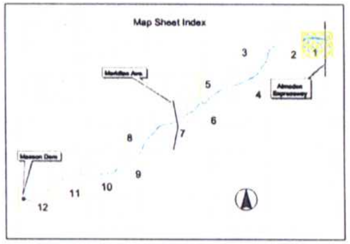
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4. See map sheet index for adjoining sheets.

20 0 20 40 60
Scale in feet

Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline
Soil
Map

Legend

⊙ Soil Pit with Piezometer
○ Soil Pit without Piezometer
⊙ Pit_piez_loc.shp

▨ Low Flow (November 1999)

▨ Soil Map Unit A
🟥 Soil Map Unit B
🟧 Soil Map Unit Bd
▨ Soil Map Unit C
Soil Map Unit Cc
🟨 Soil Map Unit Cd
🟧 Soil Map Unit D
🟥 Soil Map Unit Dd
🟥 Soil Map Unit E

Index Contour (5' Interval)
Contour (1' Interval)

Jones & Stokes

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Soil

Sheet 1 of 12

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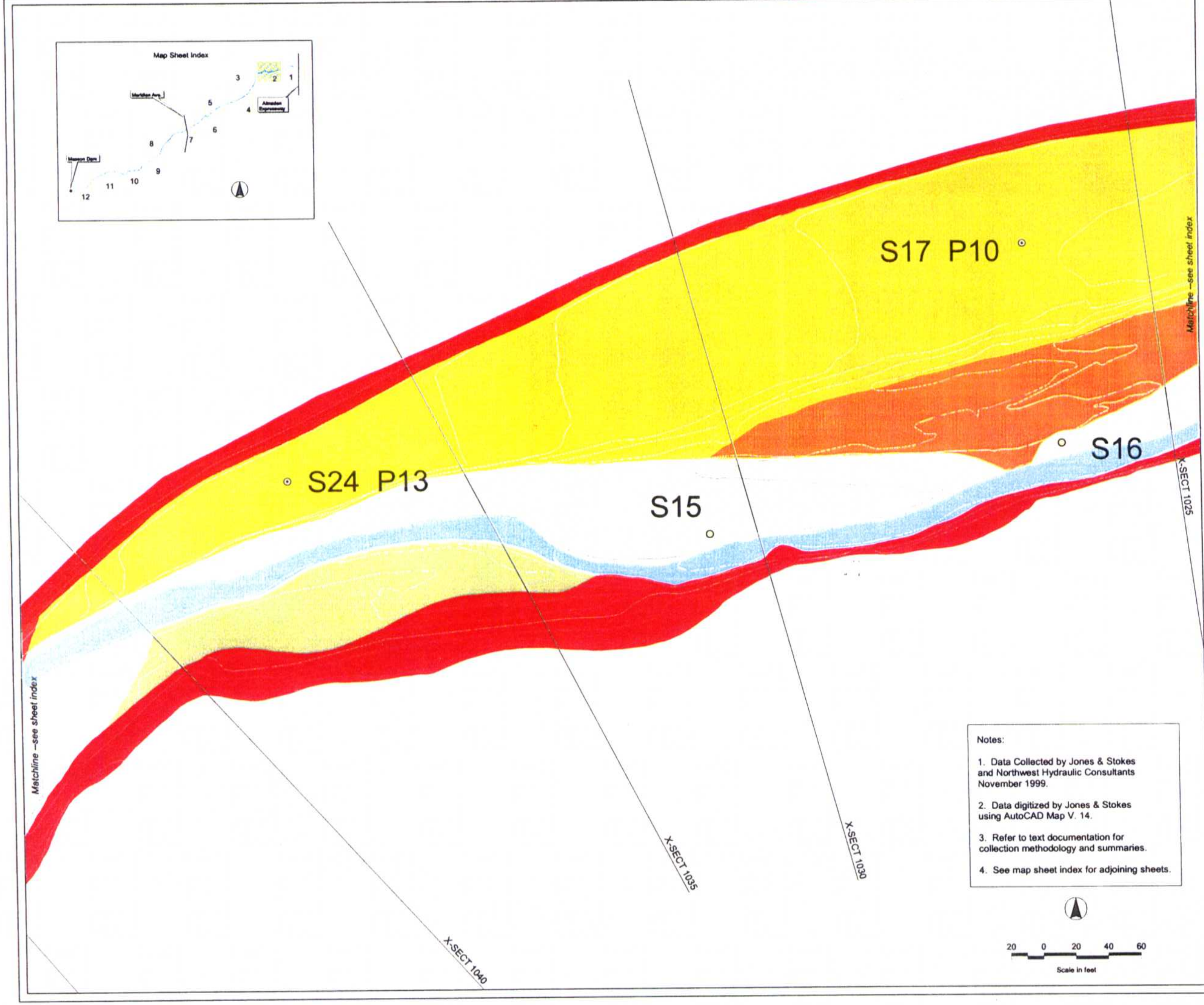

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Soil Map

Legend

- ⊙ Soil Pit with Piezometer
- ○ Soil Pit without Piezometer
- ⊙ Pit_piez_loc.shp
- Low Flow (November 1999)
- Soil Map Unit A
- Soil Map Unit B
- Soil Map Unit Bd
- Soil Map Unit C
- Soil Map Unit Cc
- Soil Map Unit Cd
- Soil Map Unit D
- Soil Map Unit Dd
- Soil Map Unit E
- Index Contour (5' Interval)
- Contour (1' Interval)

Jones & Stokes
nhc northwest hydraulic consultants

Soil

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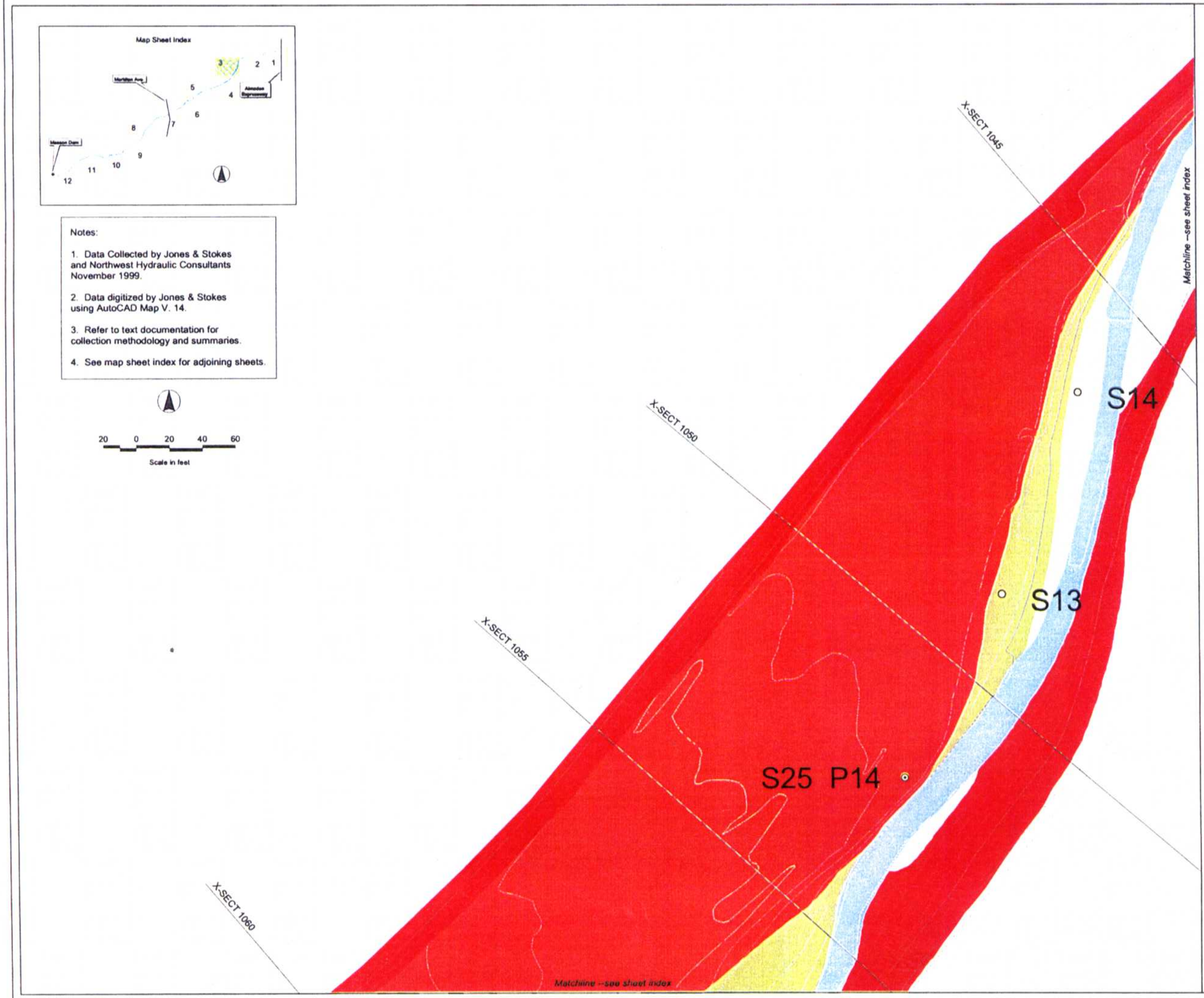

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Soil Map

Legend

⊙ Soil Pit with Piezometer
○ Soil Pit without Piezometer
⊙ Pit_piez_loc.shp

Low Flow (November 1999)

Soil Map Unit A
Soil Map Unit B
Soil Map Unit Bd
Soil Map Unit C
Soil Map Unit Cc
Soil Map Unit Cd
Soil Map Unit D
Soil Map Unit Dd
Soil Map Unit E

Index Contour (5' Interval)
Contour (1' Interval)

Jones & Stokes
nhc northwest hydraulic consultants

Soil

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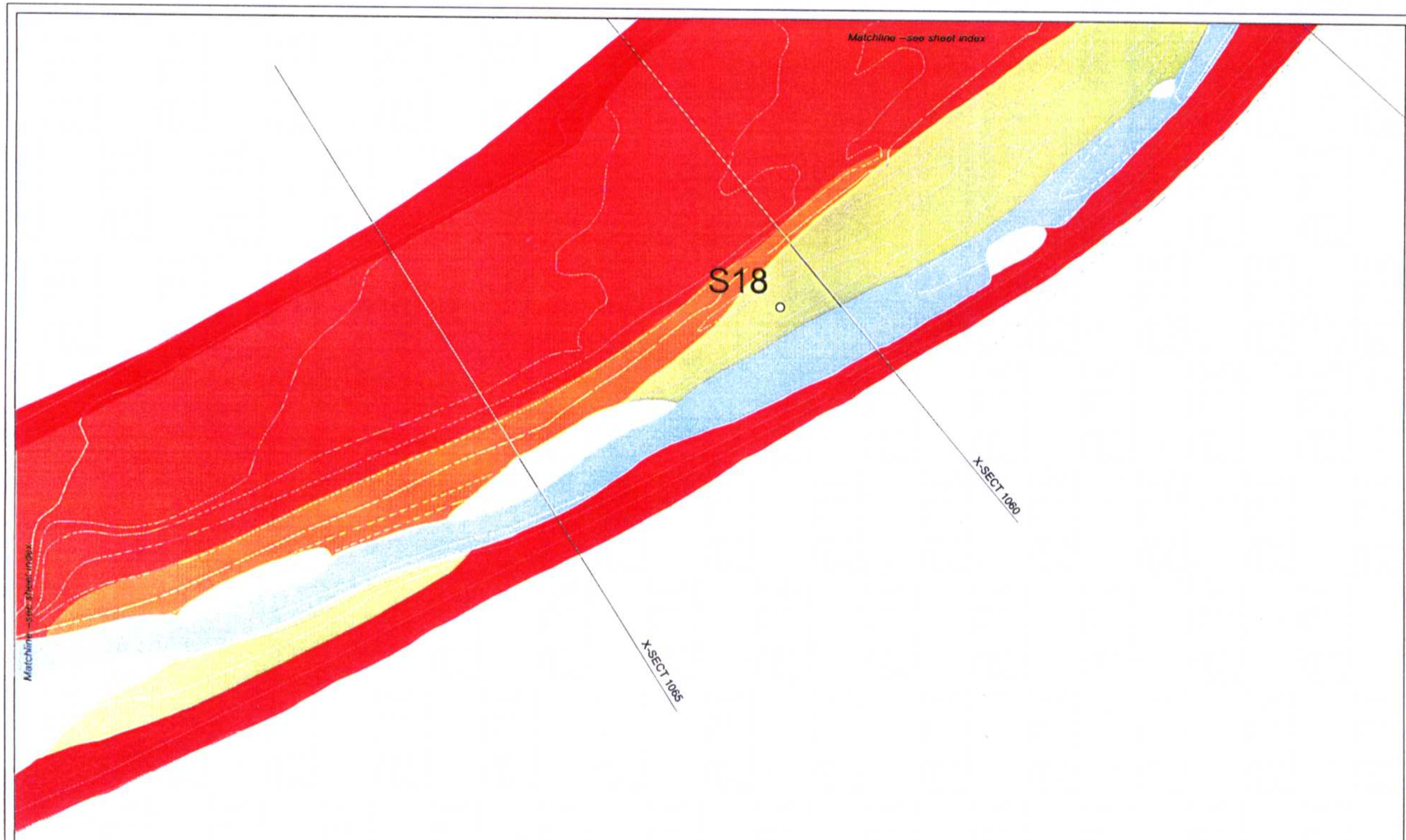

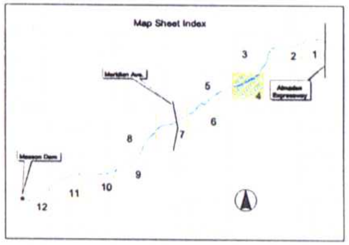

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Soil Map

Legend

⊙ Soil Pit with Piezometer
○ Soil Pit without Piezometer
⊙ Pit_piez_loc.shp

Low Flow (November 1999)

▨ Soil Map Unit A
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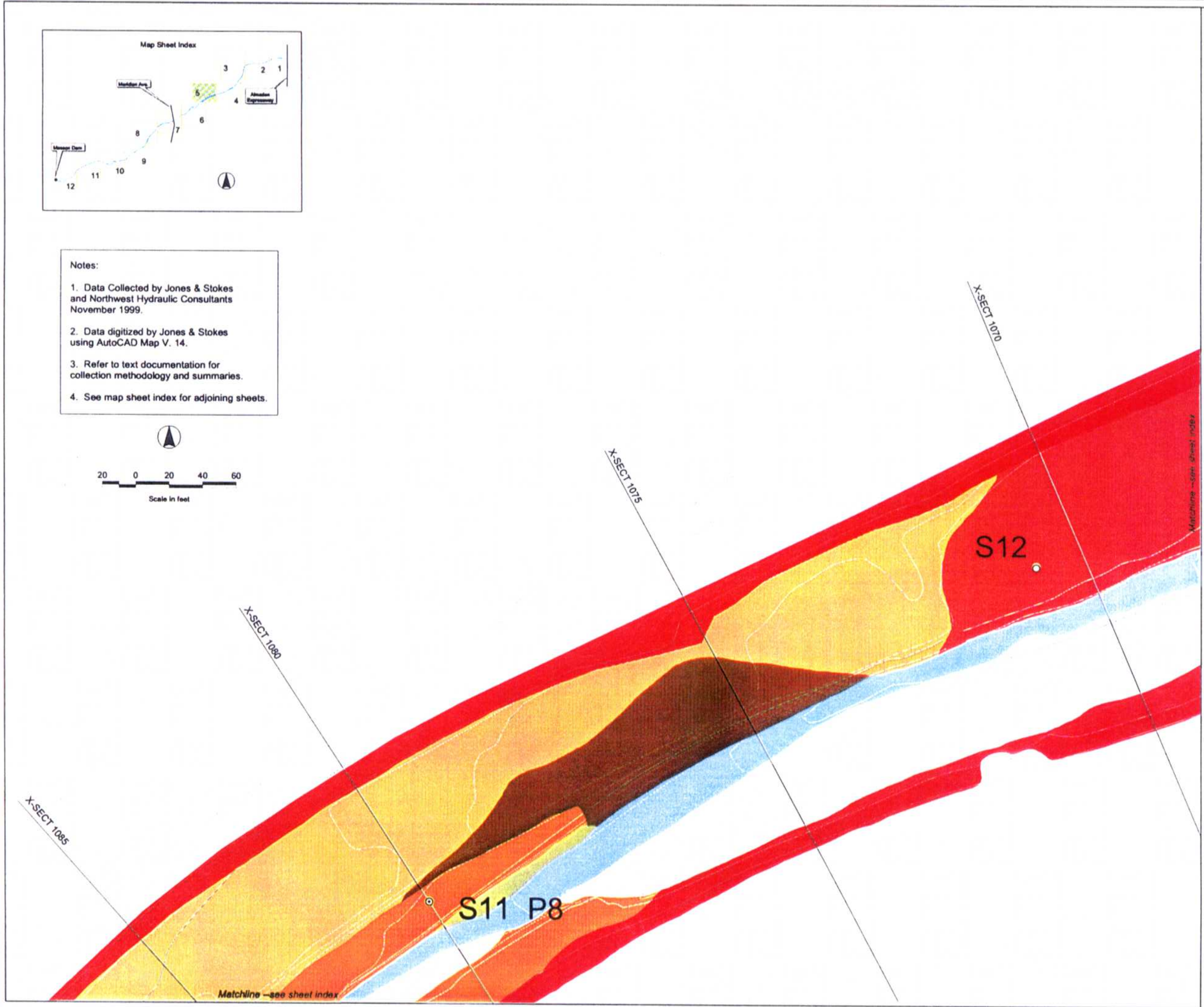
🟨 Soil Map Unit Cd
🟧 Soil Map Unit D
🟥 Soil Map Unit Dd
🟥 Soil Map Unit E

Index Contour (5' Interval)
Contour (1' Interval)

Jones & Stokes
nhc northwest hydraulic consultants

Soil
Sheet 4 of 12
March 23, 2000



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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Soil Map

Legend

- ⊙ Soil Pit with Piezometer
- ○ Soil Pit without Piezometer
- ⊙ Pit_piez_loc.shp
- Low Flow (November 1999)
- Soil Map Unit A
- Soil Map Unit B
- Soil Map Unit Bd
- Soil Map Unit C
- Soil Map Unit Cc
- Soil Map Unit Cd
- Soil Map Unit D
- Soil Map Unit Dd
- Soil Map Unit E
- Index Contour (5' Interval)
- Contour (1' Interval)

Jones & Stokes

nhc northwest hydraulic consultants

Soil

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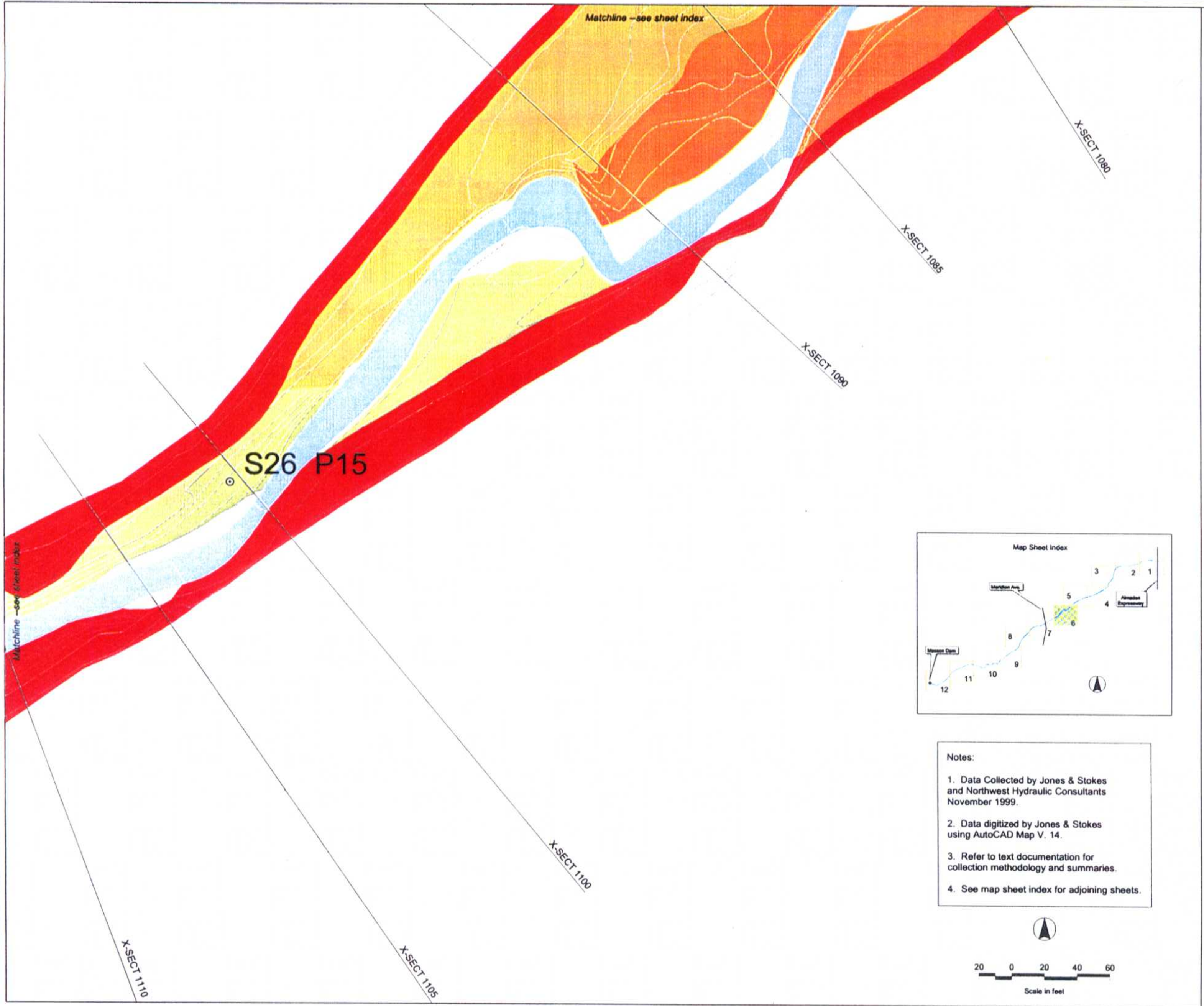

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Soil Map

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⊙ Pit_piez_loc.shp

Low Flow (November 1999)

Soil Map Unit A
Soil Map Unit B
Soil Map Unit Bd
Soil Map Unit C
Soil Map Unit Cc
Soil Map Unit Cd
Soil Map Unit D
Soil Map Unit Dd
Soil Map Unit E

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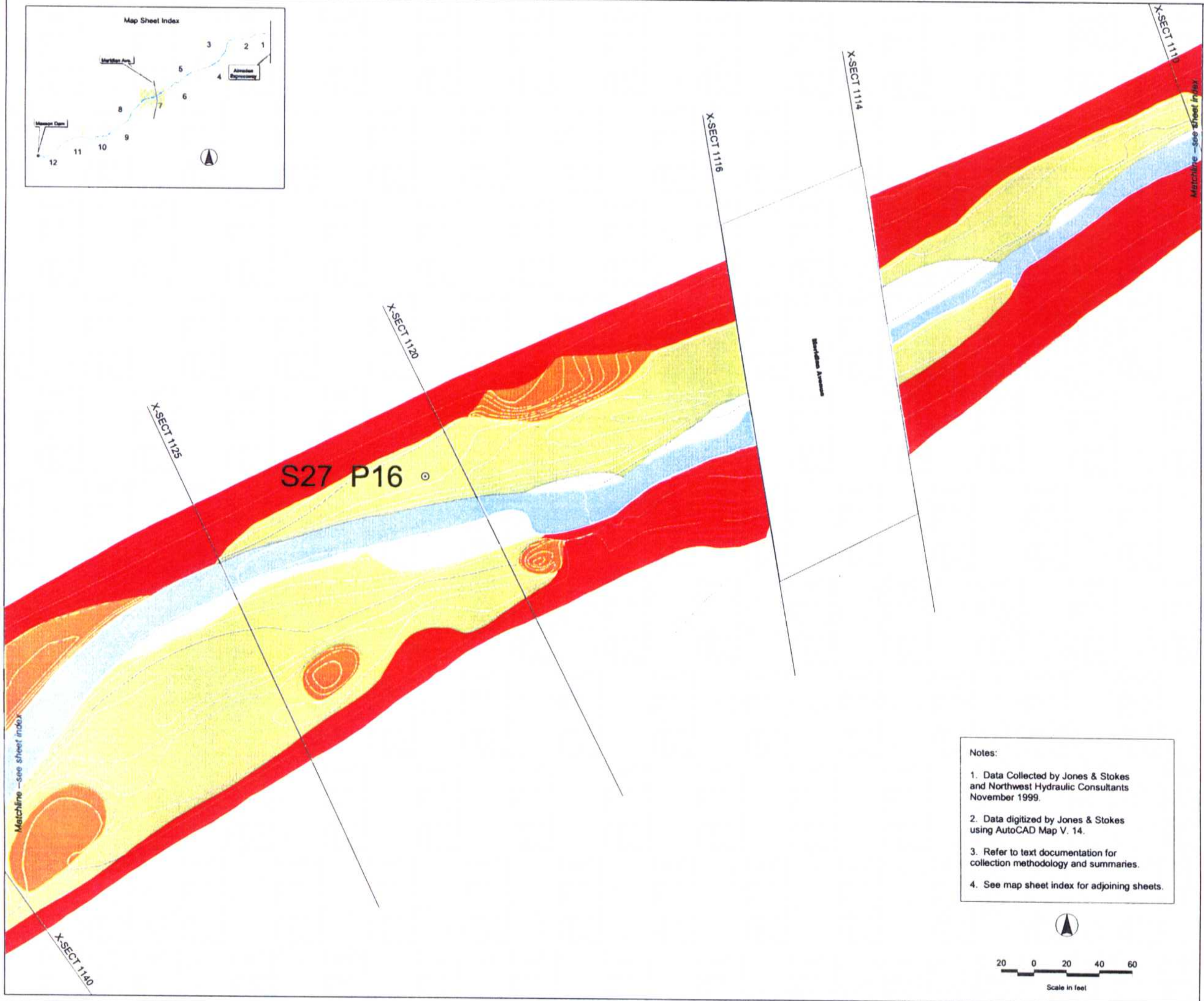
Contour (1' Interval)

Jones & Stokes
nhc northwest hydraulic consultants

Soil

Sheet 6 of 12

March 23, 2000



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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

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▨ Soil Map Unit B
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Soil Map Unit Cc
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Contour (1' Interval)

Jones & Stokes

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Soil

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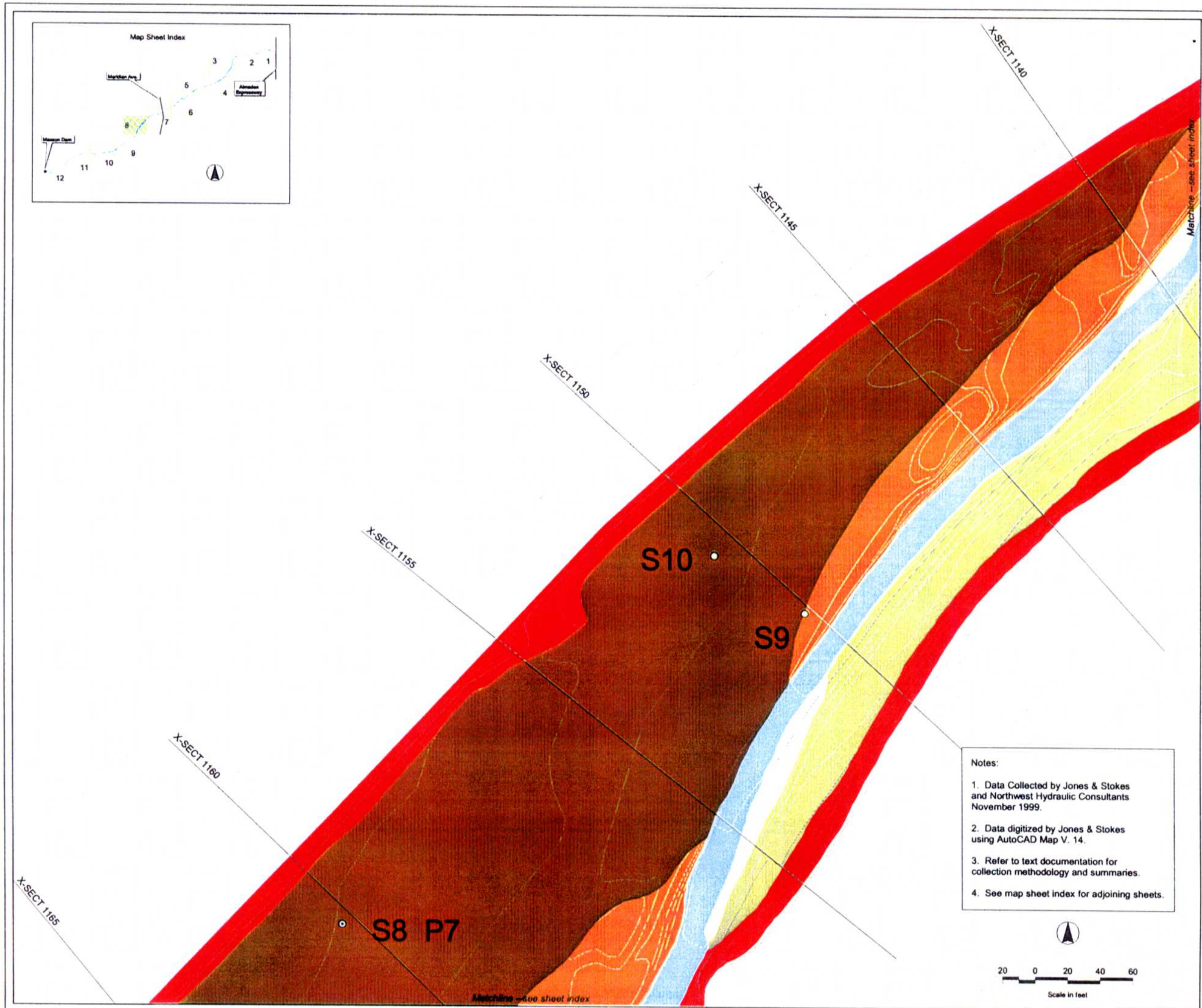
March 23, 2000



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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

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▨ Soil Map Unit Bd
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Soil Map Unit Cc
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Index Contour (5' Interval)
Contour (1' Interval)

Jones & Stokes
nhc northwest hydraulic consultants

Soil
Sheet 8 of 12
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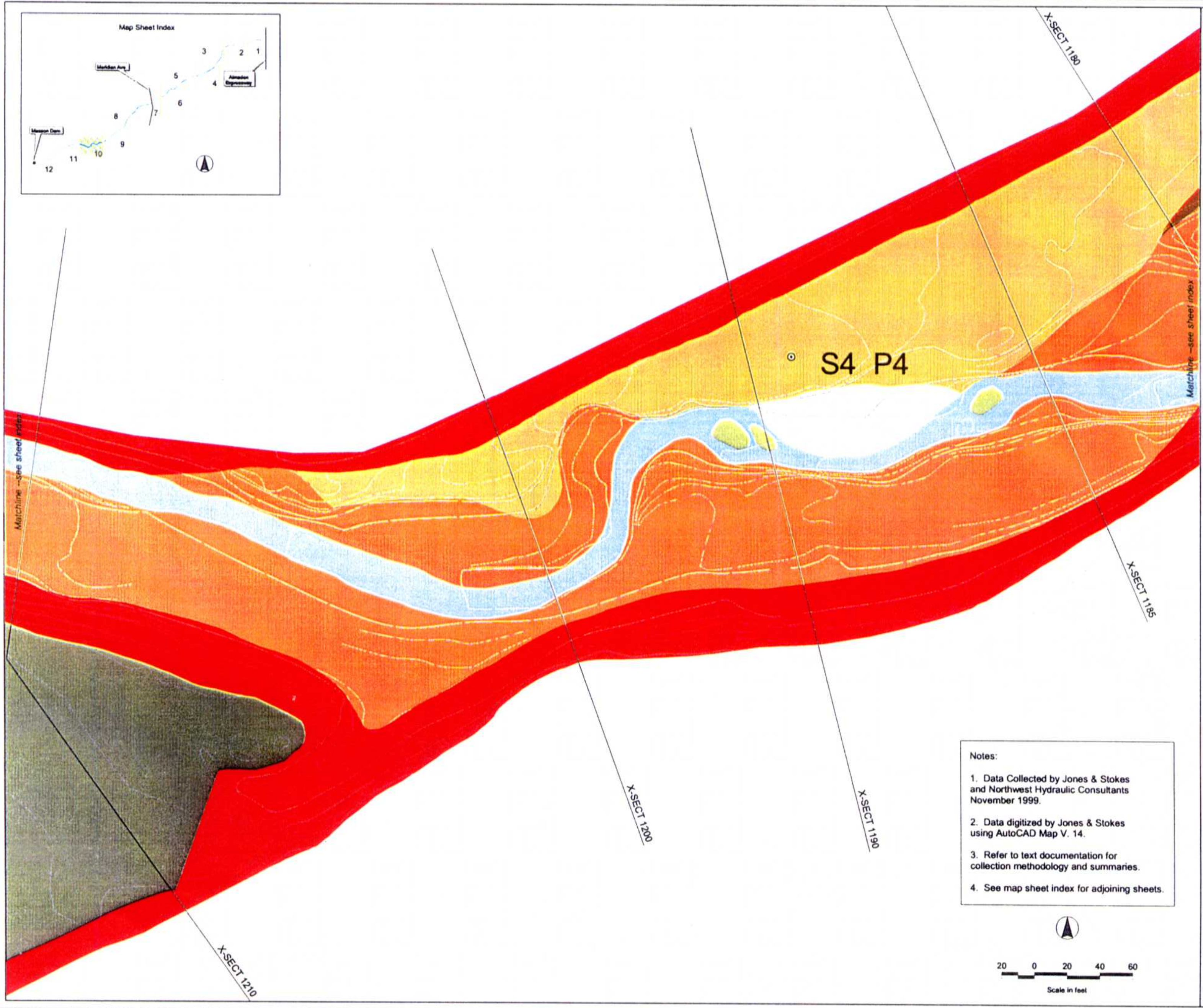

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

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Soil Map Unit Cc
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Contour (1' Interval)

Jones & Stokes

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Soil

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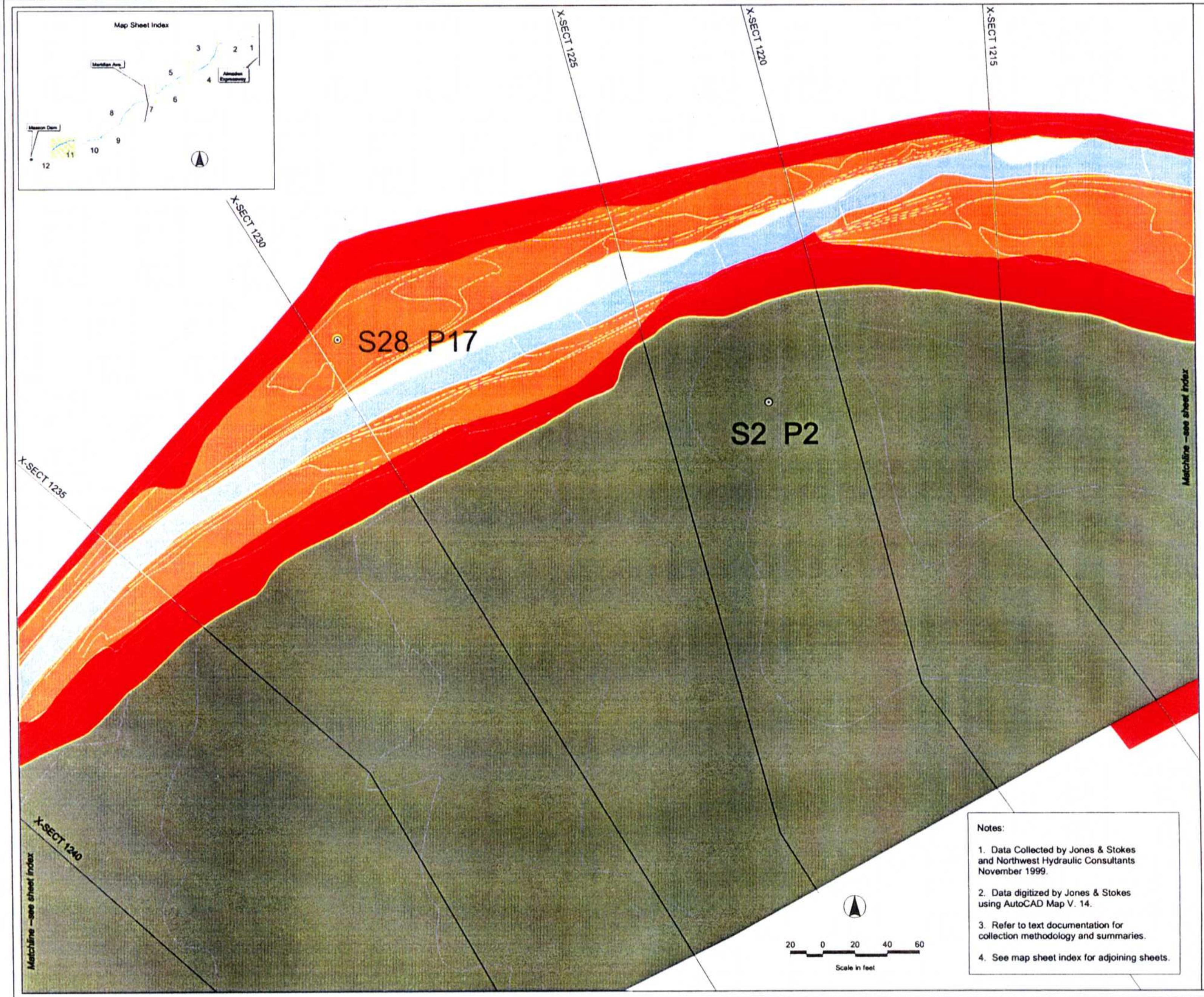

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

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Contour (1' Interval)

Jones & Stokes

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Soil

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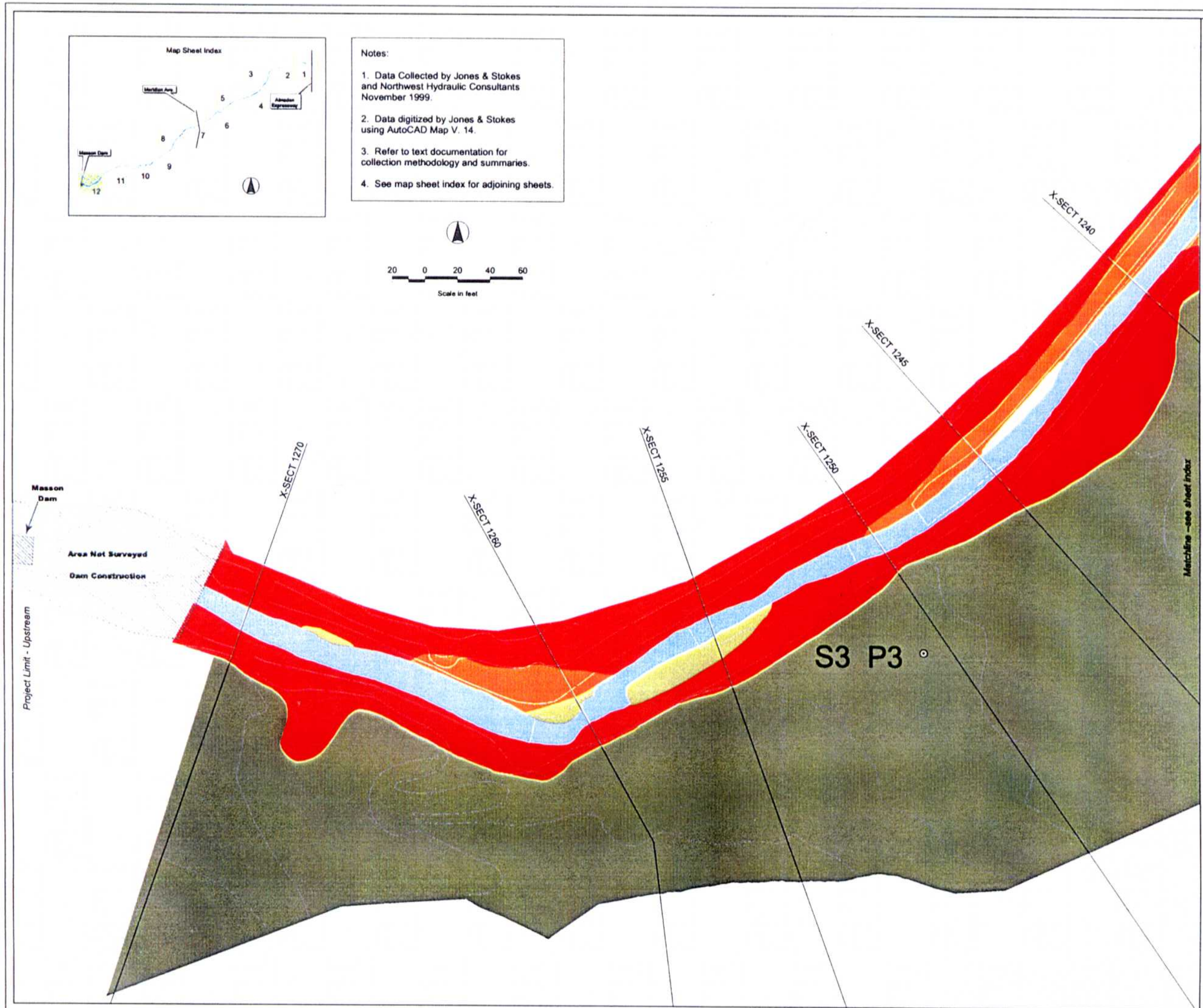
March 23, 2000



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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Soil Map

Legend

⊙ Soil Pit with Piezometer
○ Soil Pit without Piezometer

Low Flow (November 1999)

Soil Map Unit A
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Soil Map Unit Bd
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Soil Map Unit Cd
Soil Map Unit D
Soil Map Unit Dd
Soil Map Unit E

Index Contour (5' Interval)
Contour (1' Interval)

Jones & Stokes
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Soil

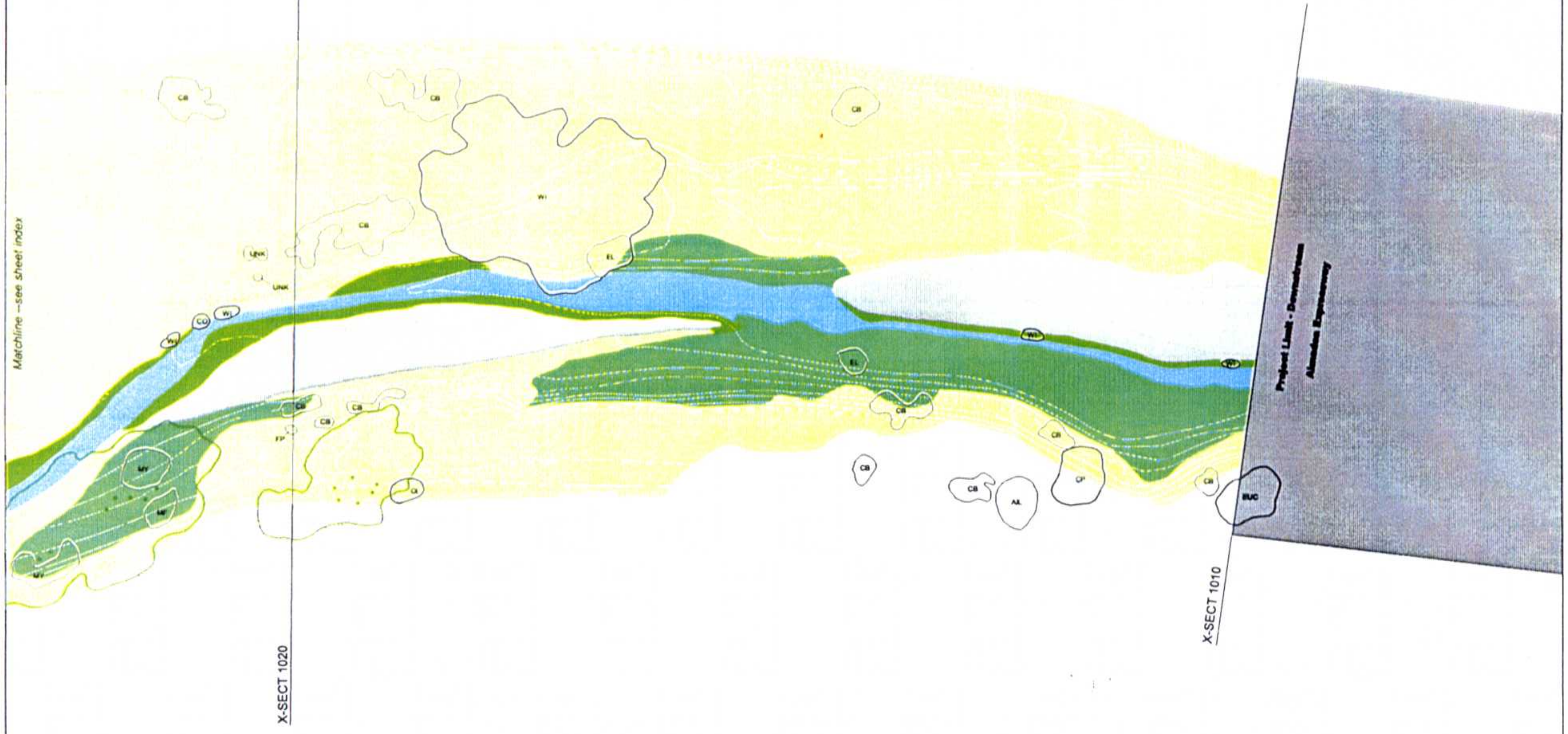
Sheet 12 of 12

March 23, 2000

Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Vegetation Map



Legend

- 🟦 Low Flow (November 1999)
- Unvegetated
- 🟨 Annual Grassland
- 🟩 Mesic Grassland
- 🟩 Shrub/Vine Scrub
- 🟩 Willow Scrub
- Index Contour (5' Interval)
- Contour (1' Interval)
- ☐ Western Sycamore Canopy
- · Western Sycamore Trunks

☐ **Tree Canopy**

AL - White Alder *(Alnus rhombifolia)*
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BU - Buckeye *(Aesculus californica)*
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☐ **Shrub Canopy**

AIL - Ailanthus *(Ailanthus altissima)*
AU - Arbutus *(Arbutus menziesii)*
BB - Himalayan Blackberry *(Rubus discolor)*
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EL - Elderberry *(Sambucus mexicana)*
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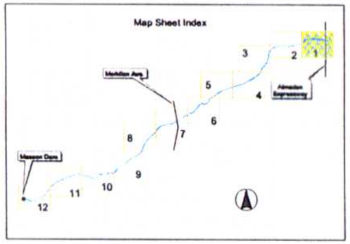
UNK - Unknown
WR - California Rose *(Rosa californica)*

Map Sheet Index



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20 0 20 40 60
Scale in feet

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Vegetation

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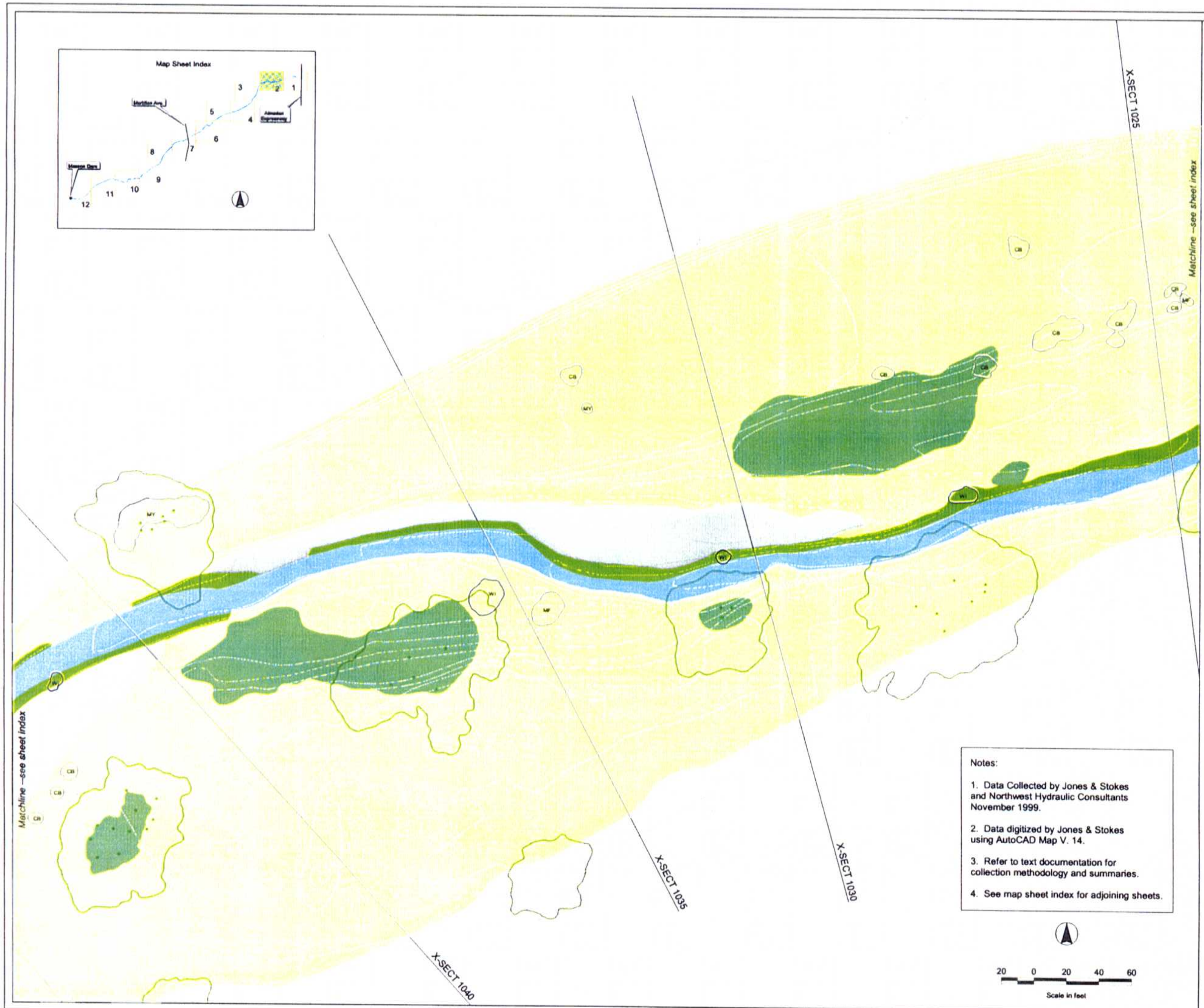

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Vegetation Map

Legend

🟦 Low Flow (November 1999)
Unvegetated
Annual Grassland
🟩 Mesic Grassland
🟩 Shrub/Vine Scrub
🟩 Willow Scrub
Index Contour (5' Interval)
Contour (1' Interval)

☐ Western Sycamore Canopy
· Western Sycamore Trunks

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☐ **Shrub Canopy**
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UNK - Unknown
WR - California Rose *(Rosa californica)*

Jones & Stokes

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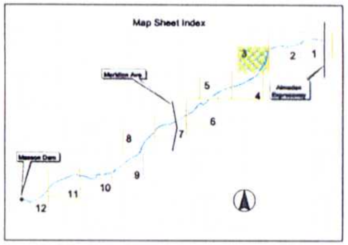
Vegetation

Sheet 2 of 12

March 23, 2000



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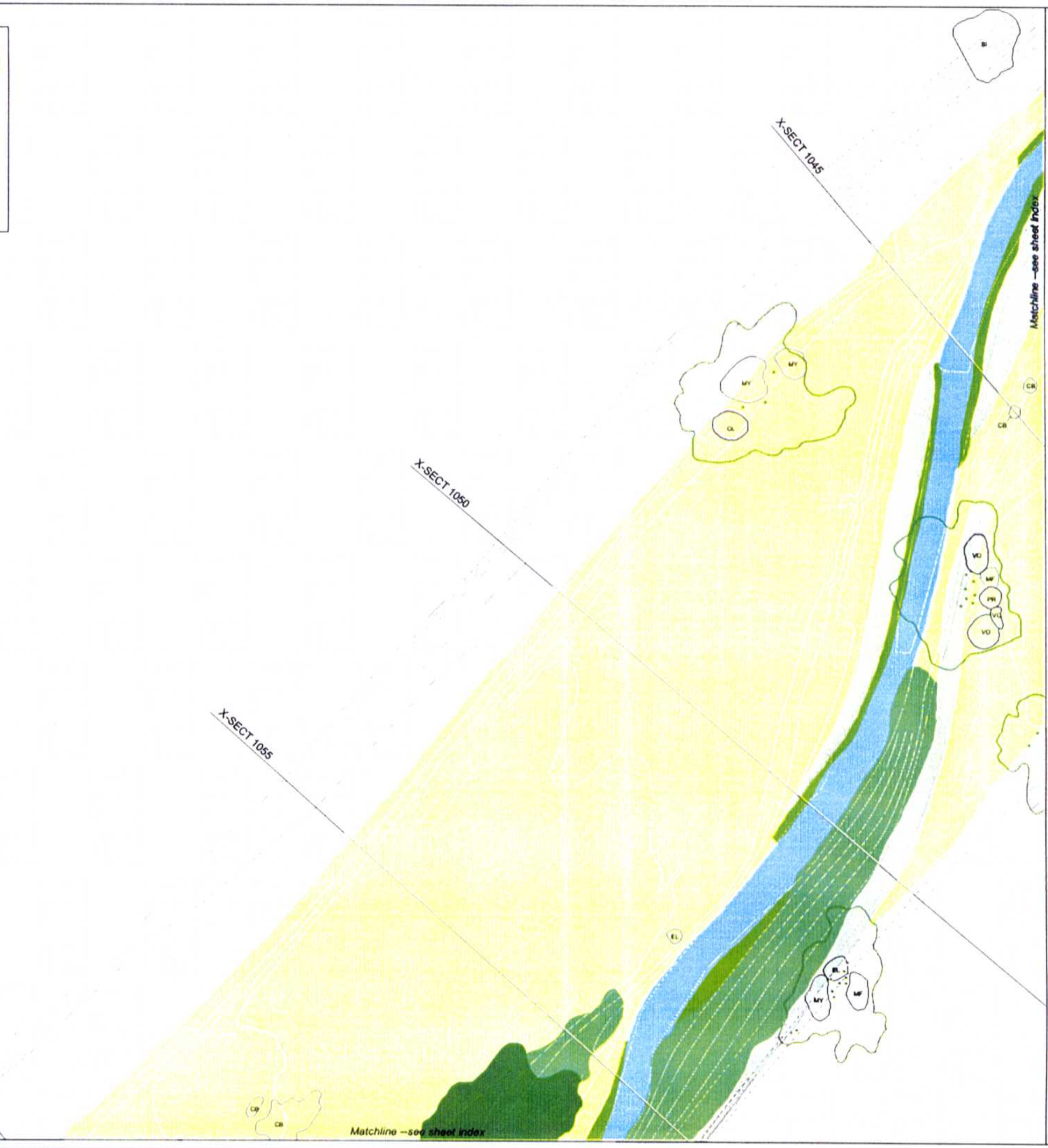

Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Vegetation Map

Legend

- 🟦 Low Flow (November 1999)
- Unvegetated
- 🟨 Annual Grassland
- 🟩 Mesic Grassland
- 🟩 Shrub/Vine Scrub
- 🟩 Willow Scrub
- Index Contour (5' Interval)
- Contour (1' Interval)
- ☐ Western Sycamore Canopy
- · Western Sycamore Trunks

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Jones & Stokes

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Vegetation

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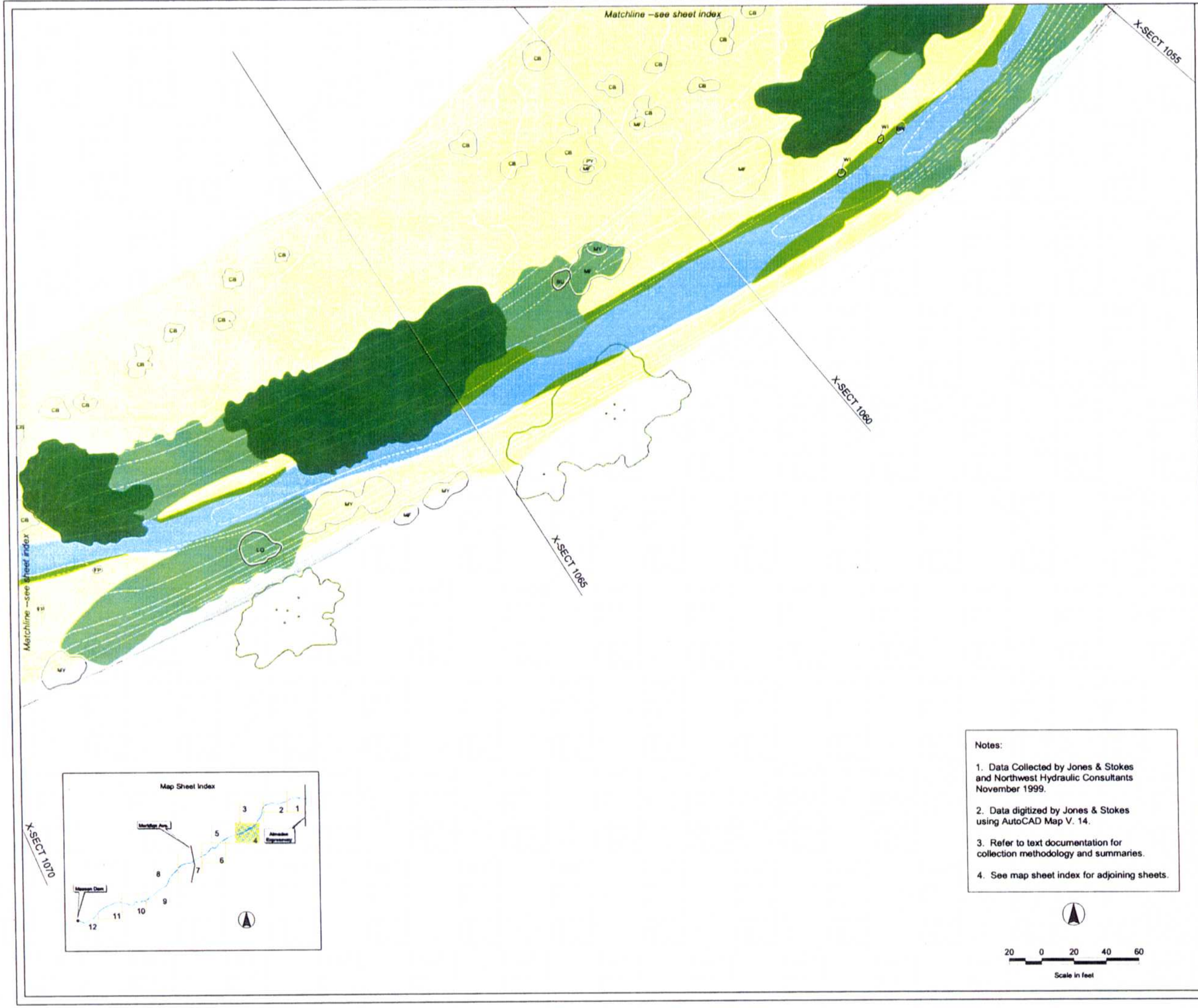

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

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Jones & Stokes

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Vegetation

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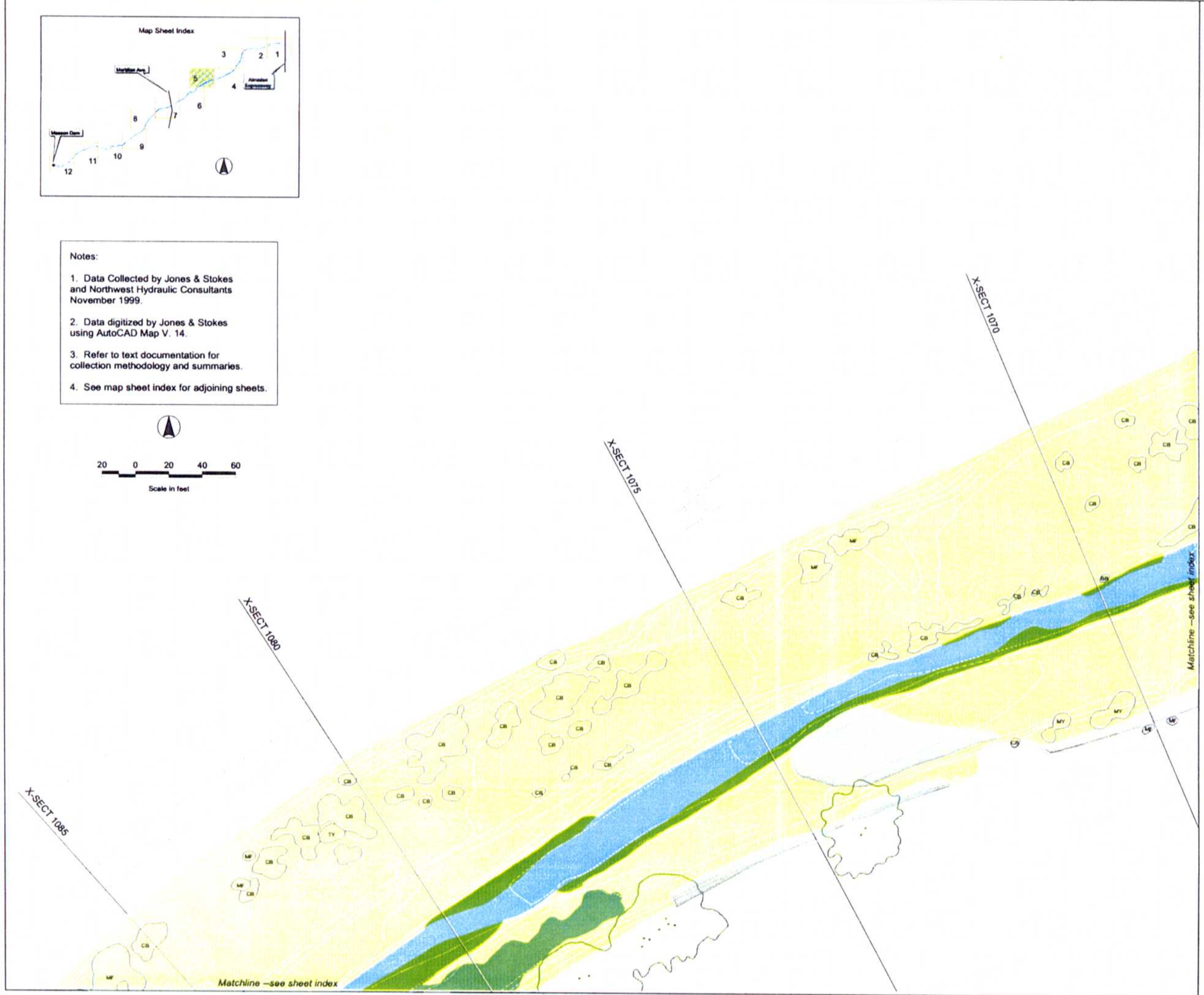

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

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Legend

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- Unvegetated
- Annual Grassland
- Mesic Grassland
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Jones & Stokes

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Vegetation

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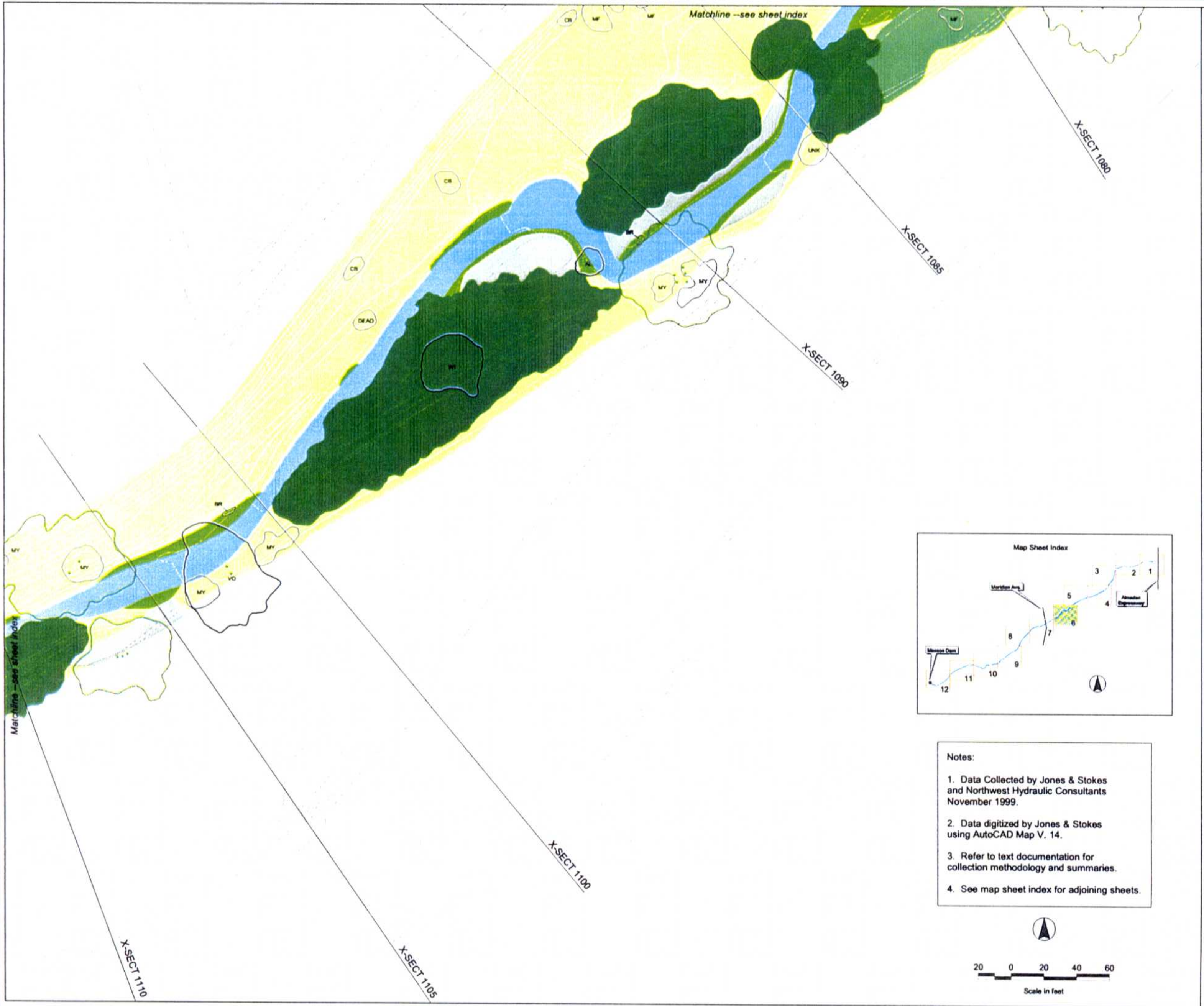
March 23, 2000



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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Vegetation Map

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Annual Grassland
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Jones & Stokes

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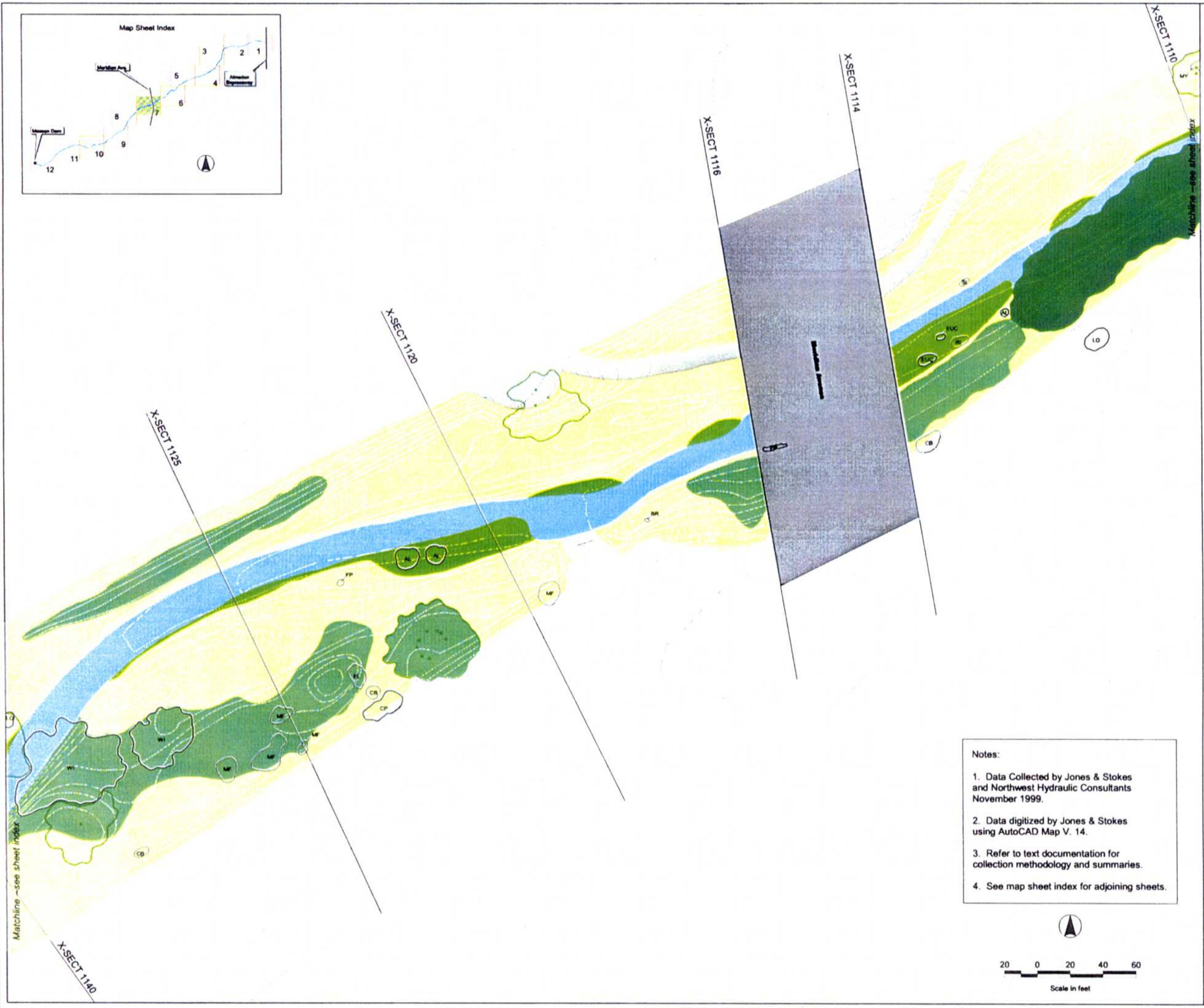
Vegetation

Sheet 6 of 12

March 23, 2000



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Santa Clara Valley Water District

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- Index Contour (5' Interval)
- Contour (1' Interval)
- ☐ Western Sycamore Canopy
- · Western Sycamore Trunks

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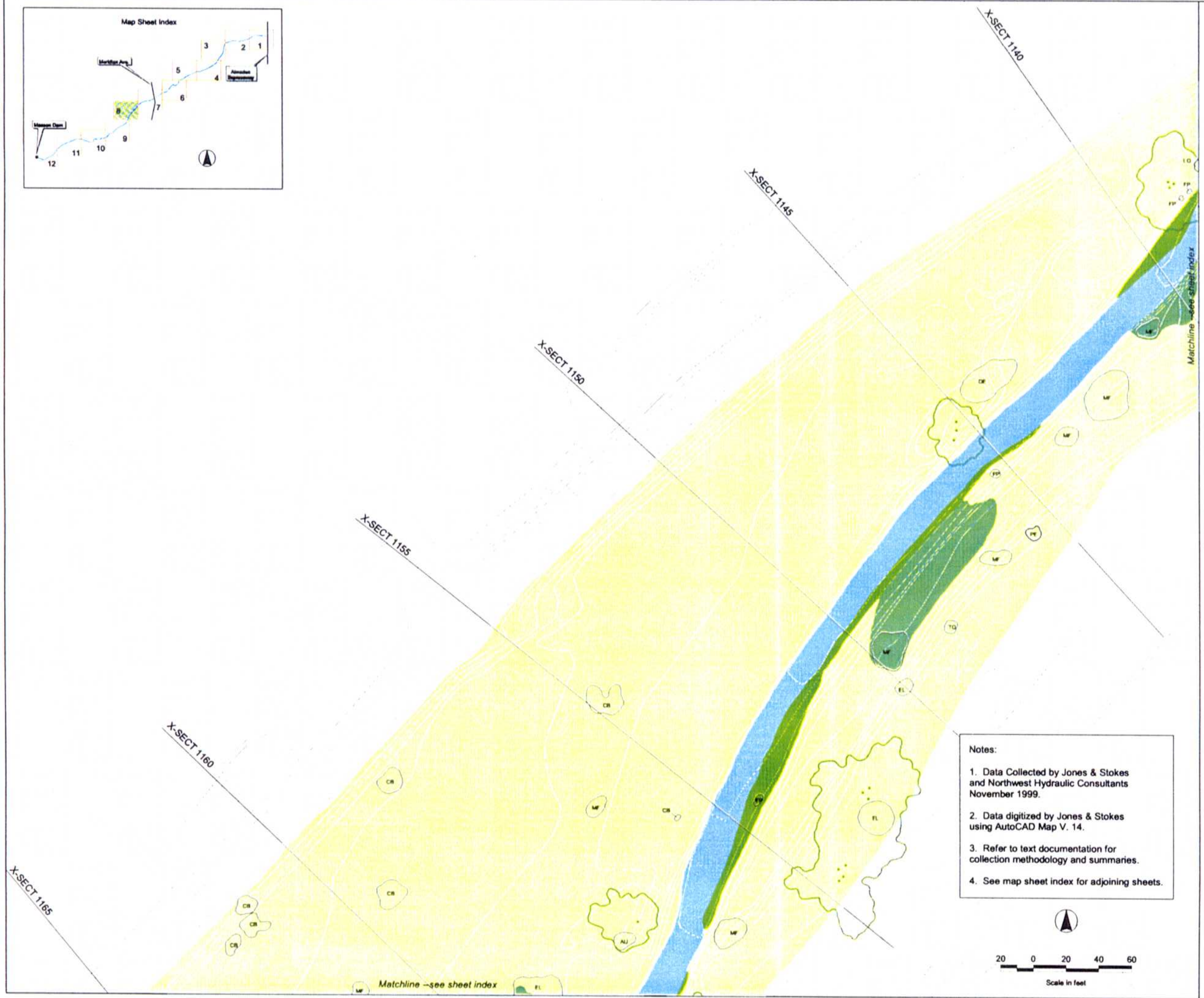
Vegetation

Sheet 7 of 12

March 23, 2000



Notes:

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Guadalupe Creek Mitigation Project

Santa Clara Valley Water District

Baseline Vegetation Map

Legend

🟦 Low Flow (November 1999)
Unvegetated
🟨 Annual Grassland
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Vegetation

Sheet 8 of 12

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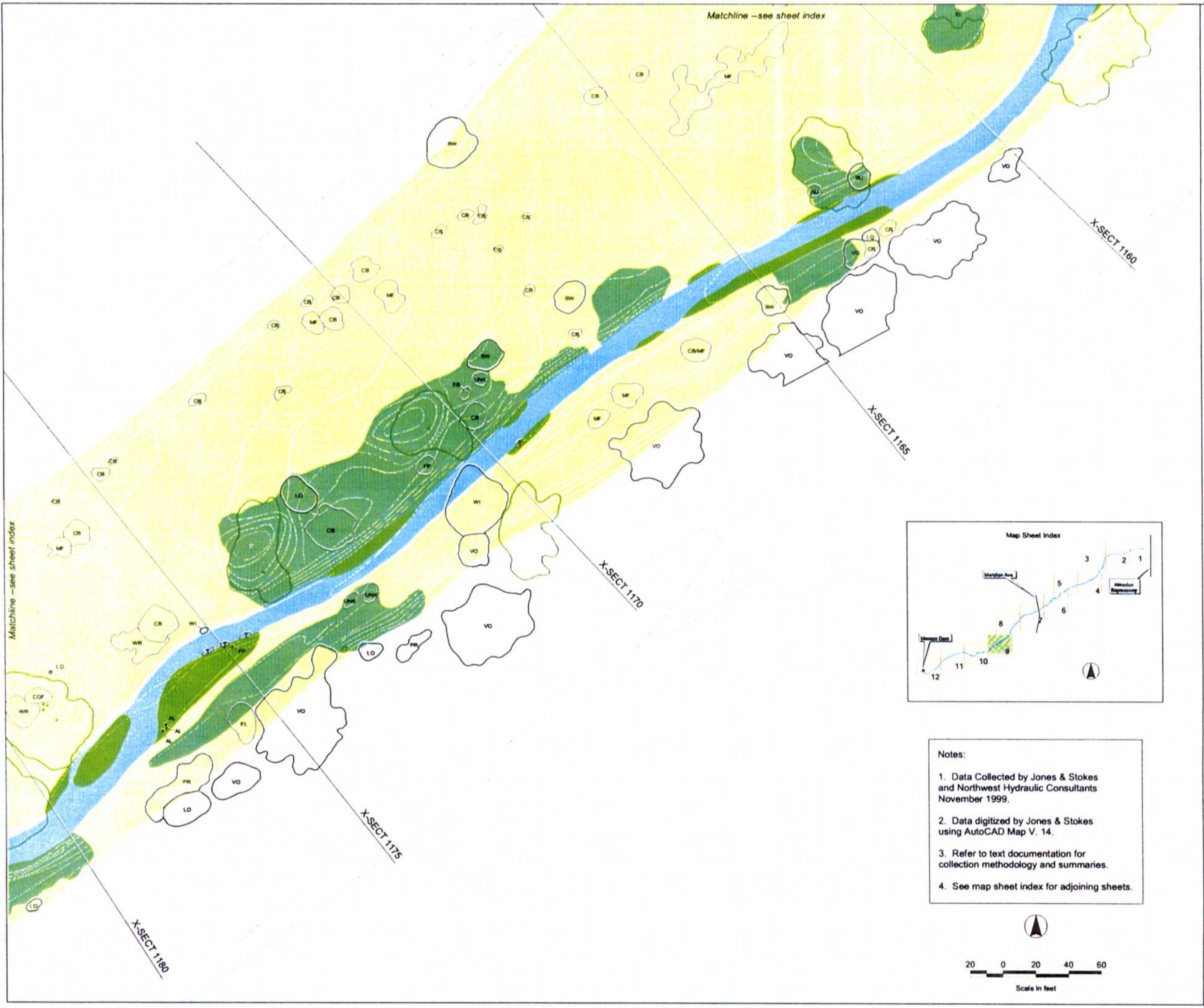

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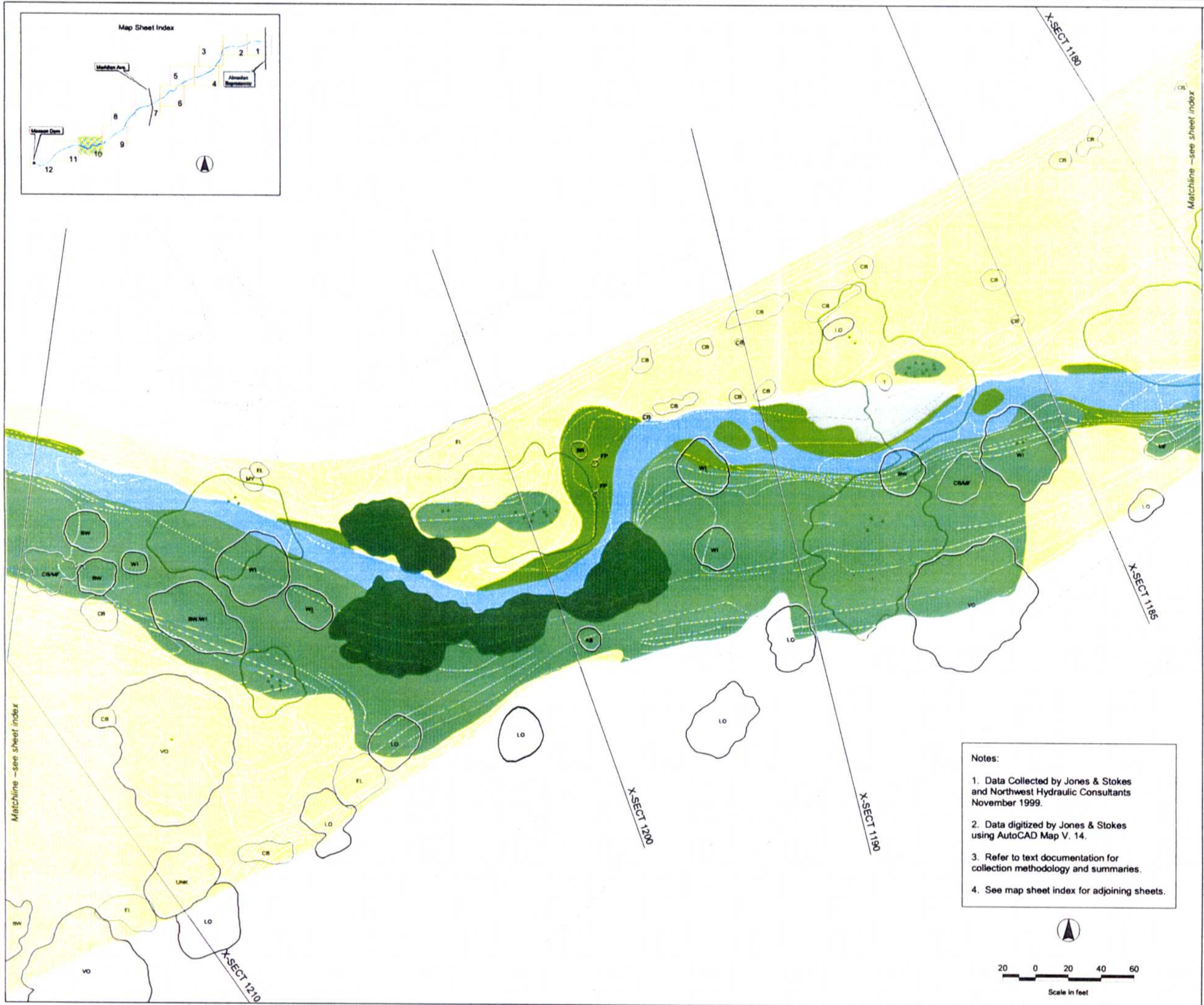

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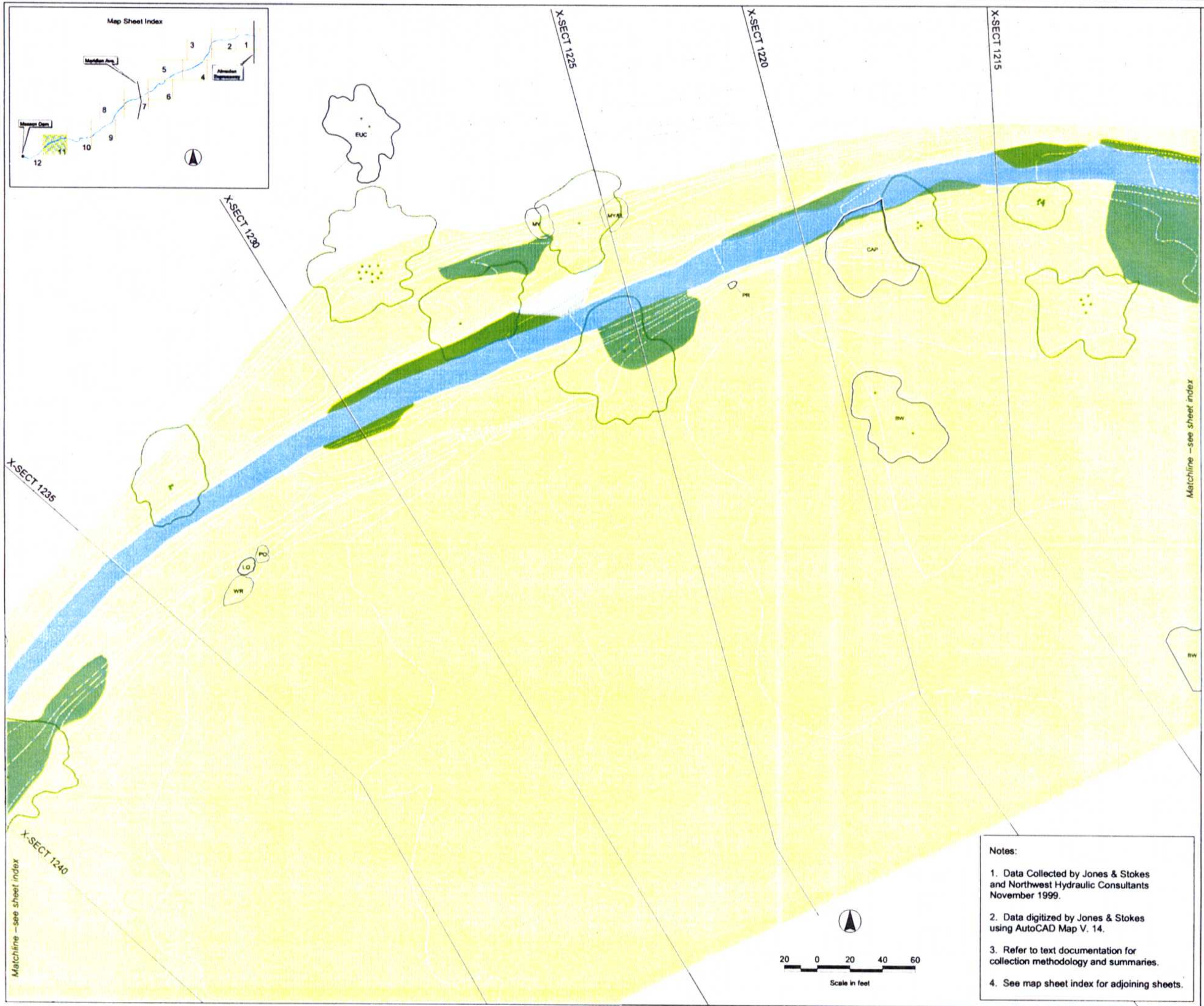

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Vegetation

Sheet 11 of 12

March 23, 2000

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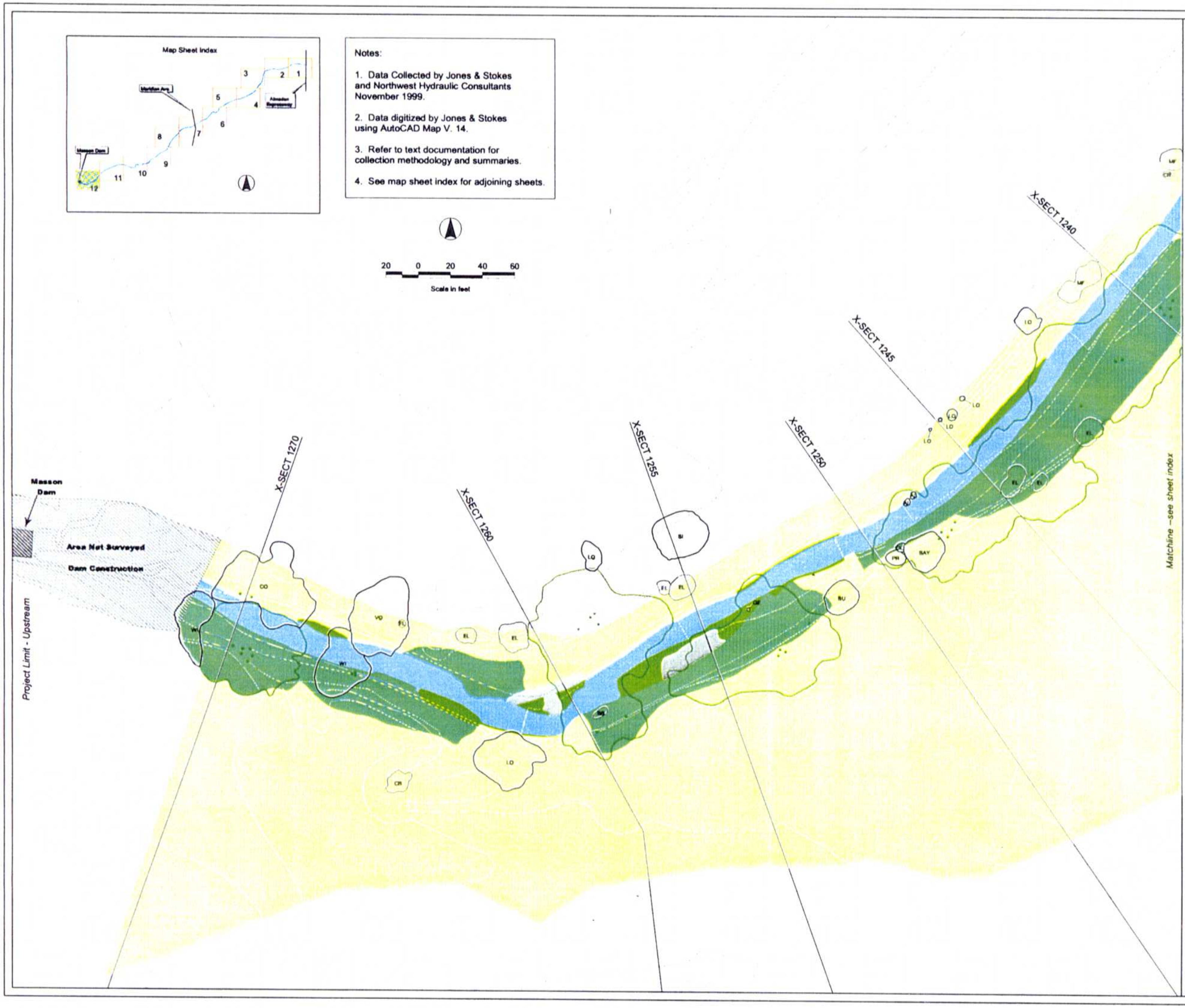

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Santa Clara Valley Water District

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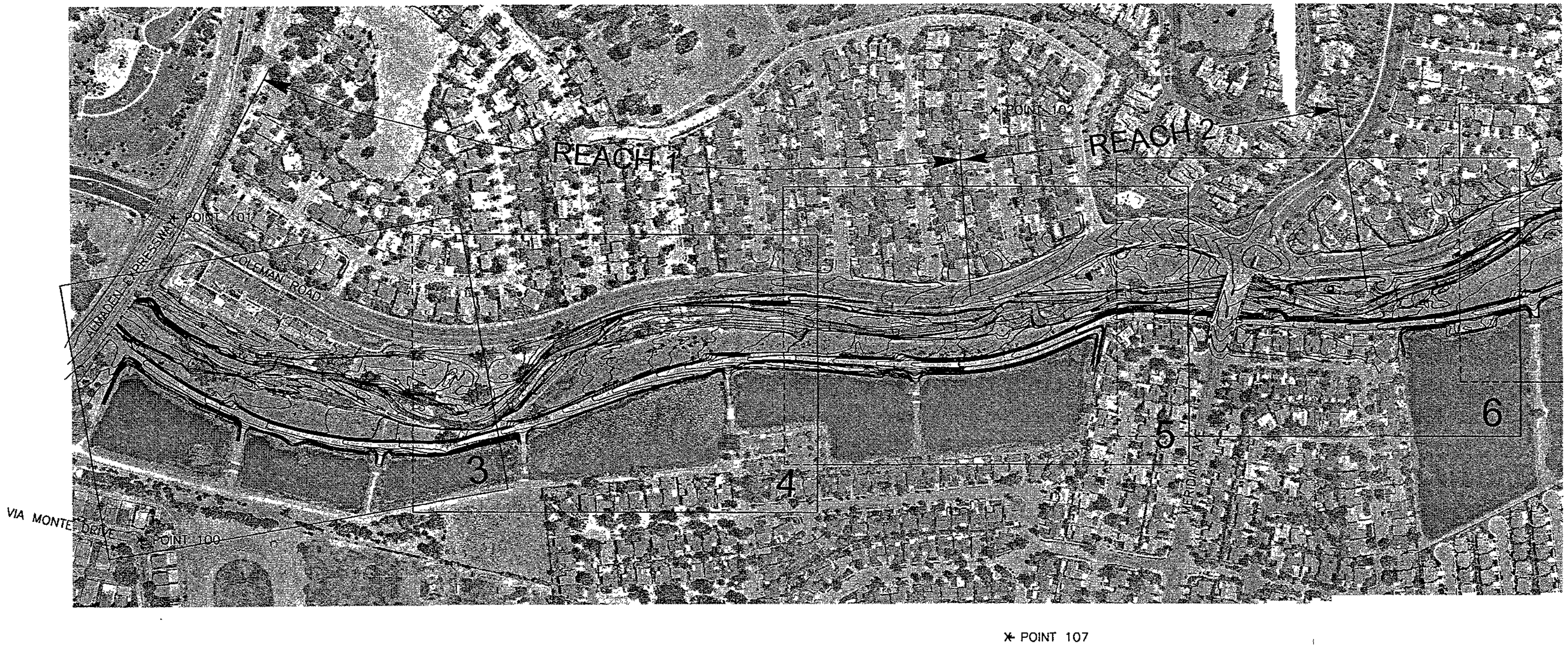
Vegetation

Sheet 12 of 12

March 23, 2000

Appendix B. Ground Survey Cross Section Locations



CONTROL LISTING FOR TOPOGRAPHIC AND CROSS SECTION MAPPING
PROVIDED BY SANTA CLARA VALLEY WATER DISTRICT (PROJECT GUADALUPE CREEK)

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	1914828.55	6161008.08	198.34	BRASS PIN MONUMENT
101	1913755.25	6161444.93	202.20	FD. PK NAIL
102	1912047.83	6159050.17	217.07	SET PK NAIL
103	1911230.07	6156990.53	239.08	SET MAG NAIL
104	1909617.25	6154716.49	253.44	SET MAG NAIL
105	1911161.71	6154001.72	273.31	SET LARGE NAIL
106	1912503.32	6156235.17	240.01	SET MAG NAIL
107	1913681.29	6158117.12	215.64	SET MAG NAIL

HORIZONTAL DATUM: NAD83
VERTICAL DATUM: NGVD29

ALL NHC CONTROL (POINTS 2001 TO 2027) ARE ALUMINUM CAPS OVER 1/2" REBAR EXCEPT CONTROL POINT 2013 WHICH IS AN AERIAL CROSS
HORIZONTAL COORDINATES FOR CONTROL POINTS WERE PROVIDED BY SCVWD AND ARE REFERENCED TO THE CONTROL LISTING ABOVE
THE LOCATION (NAD83 COORDINATES), AND ELEVATION (NGVD29) ARE PROVIDED ON SHEETS 3-9

DATE OF PHOTOGRAPHY 8/17/1999 BY AIR FLIGHT SERVICES, SANTA CLARA, CA
TOPOGRAPHIC MAPPING FURNISHED BY AELYTEK, INC, SUNNYVALE CA

Drawing Index No.:	Project No.:	File name:	Date: February 7, 2000	Designed by:
		PDP:	Revised by:	Ckd by:

Dwn by:

Revisions:	Description	Date	Approved

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Prepared for:
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2600 V STREET
SACRAMENTO, CA 95818
916 737-3000

nhc
northwest hydraulic consultants inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691
(916) 371-7400

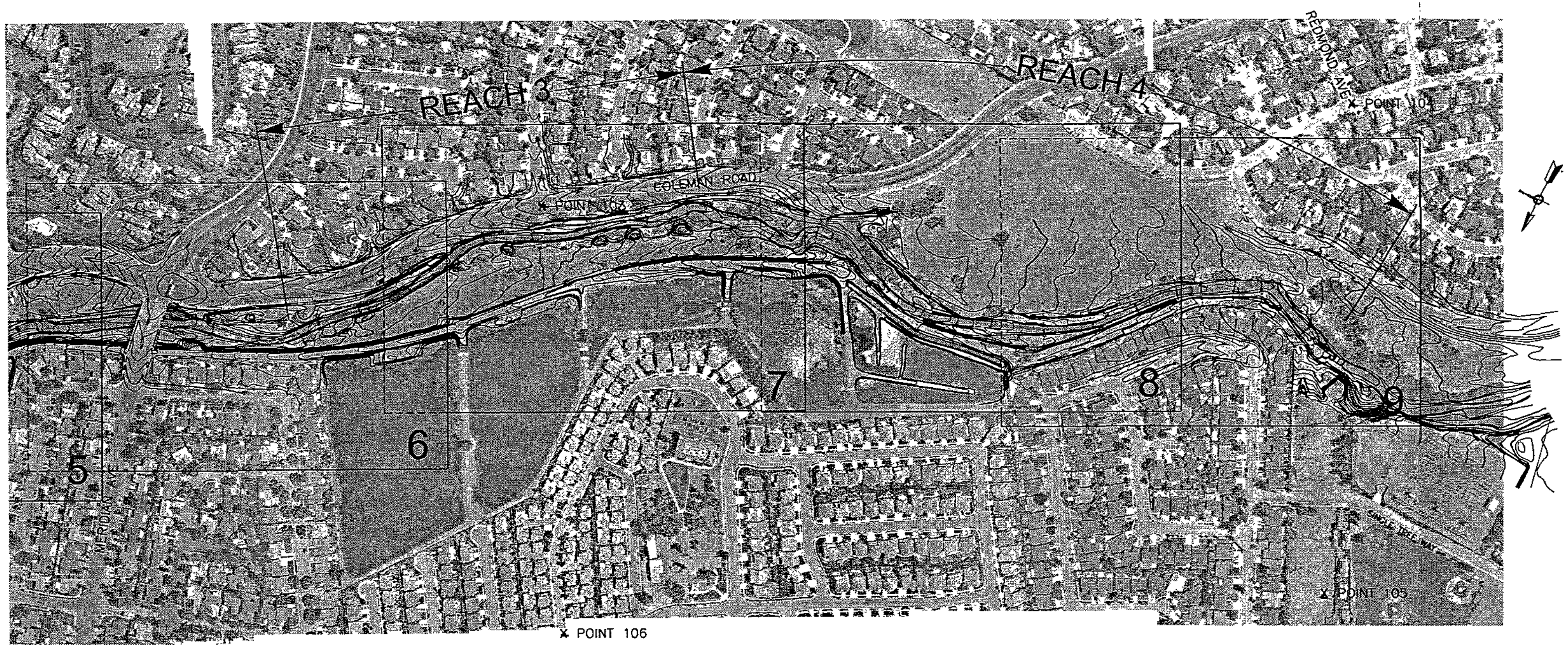
GUADALUPE CREEK
SANTA CLARA COUNTY, CA

GROUND SURVEY CROSS SECTION LOCATIONS

NOVEMBER 18- 24 SURVEY

Sheet reference number

Sheet 1 of 9



MAP LEGEND

N 1 910 200 E 6 155 400 +	NAD83 ZONE 3 GRID TICKS	⑤	GRAVEL BAR PEBBLE COUNT LOCATION
96+00	STREAM DISTANCE FROM MOUTH (HUNDREDS OF FEET)	▷ NHC 2027 N 1910434.94 E 6154502.45 ELEV 256.81	CROSS SECTION SURVEY CONTROL LOCATION
S8	SOIL TEST PIT LOCATION	X–SECT 1270 ⊕——⊕	GROUND SURVEY CROSS SECTION LOCATION
P8	PIEZOMETER WELL LOCATION		

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File name:
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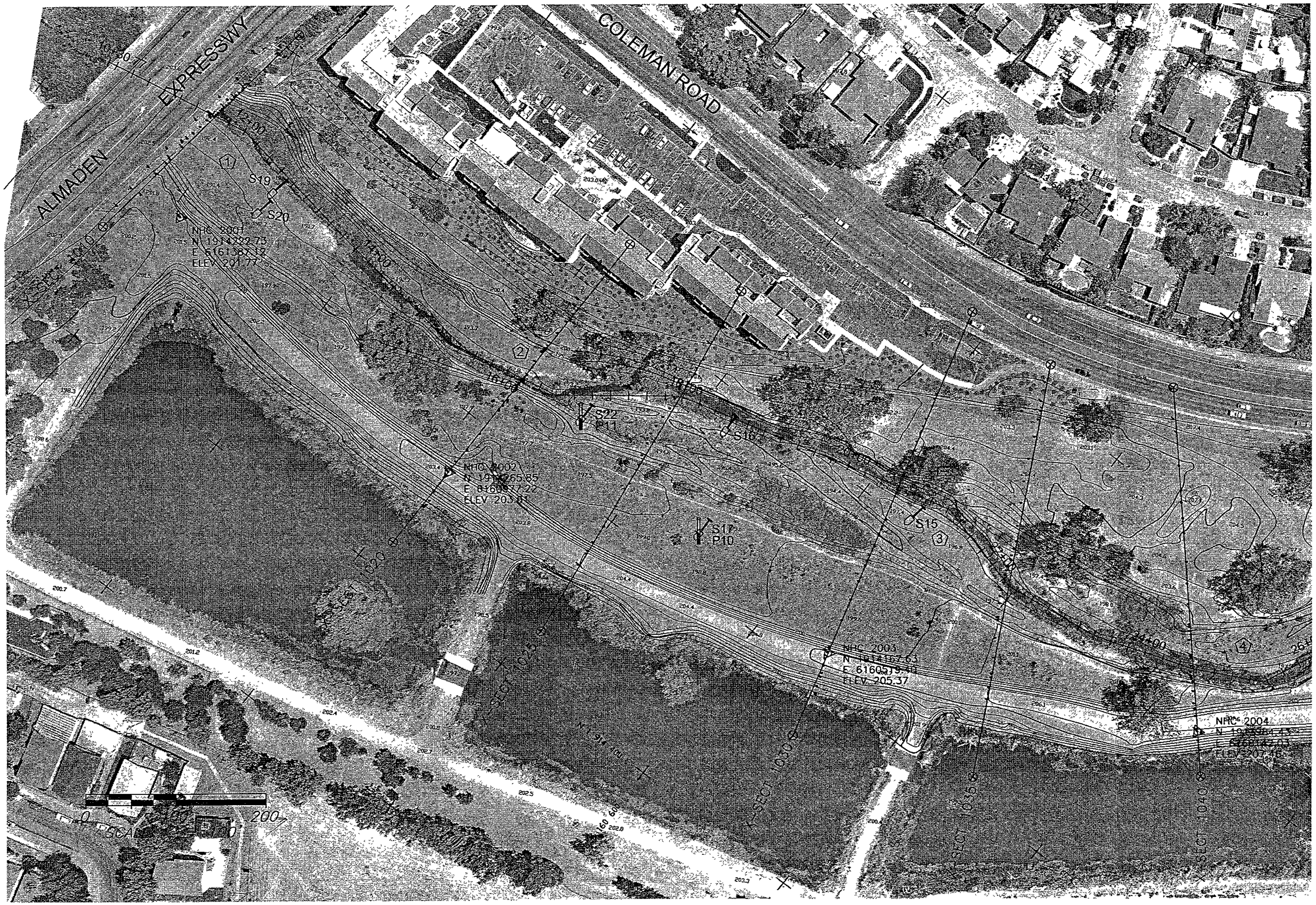
Sheet 2 of 9



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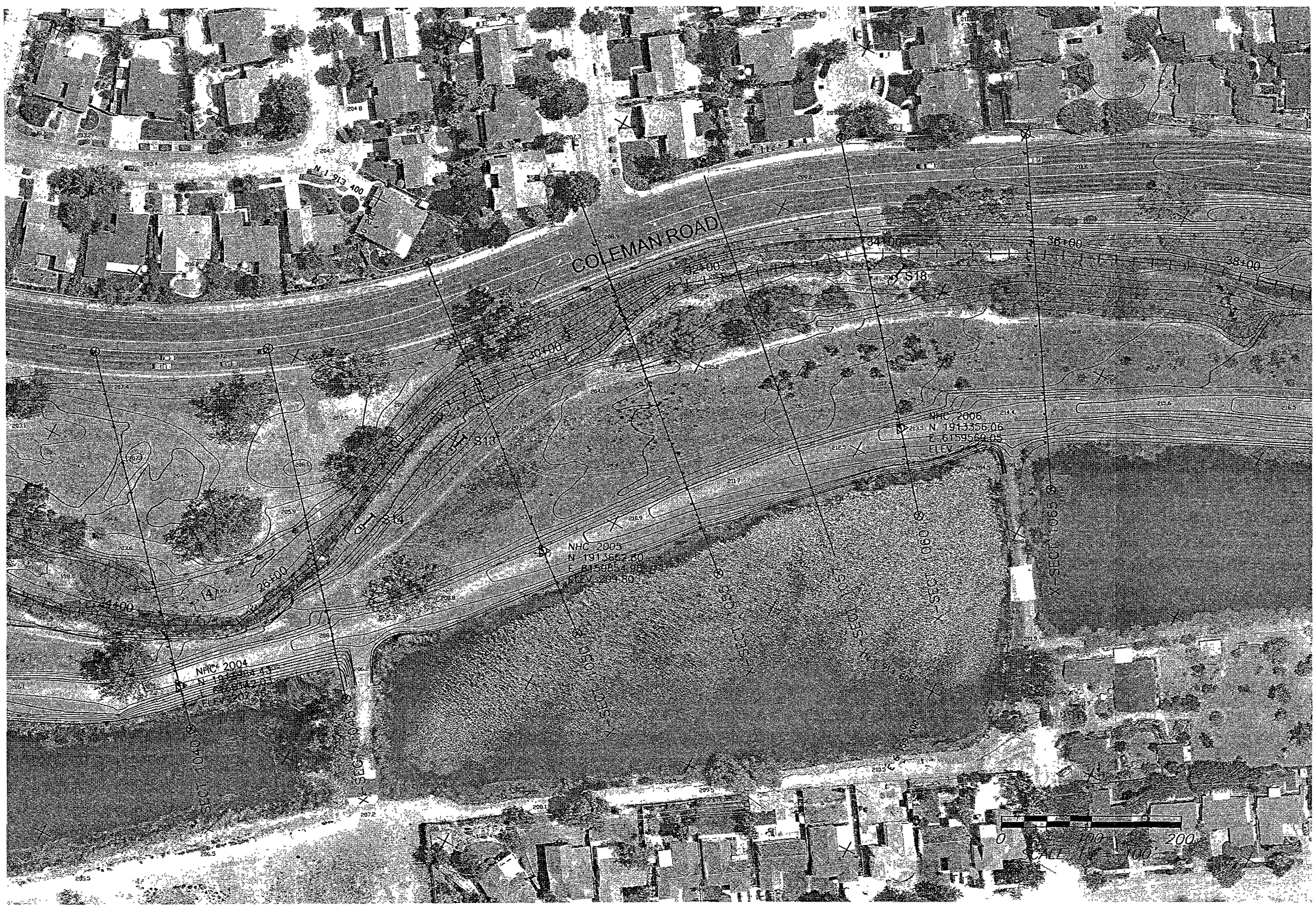

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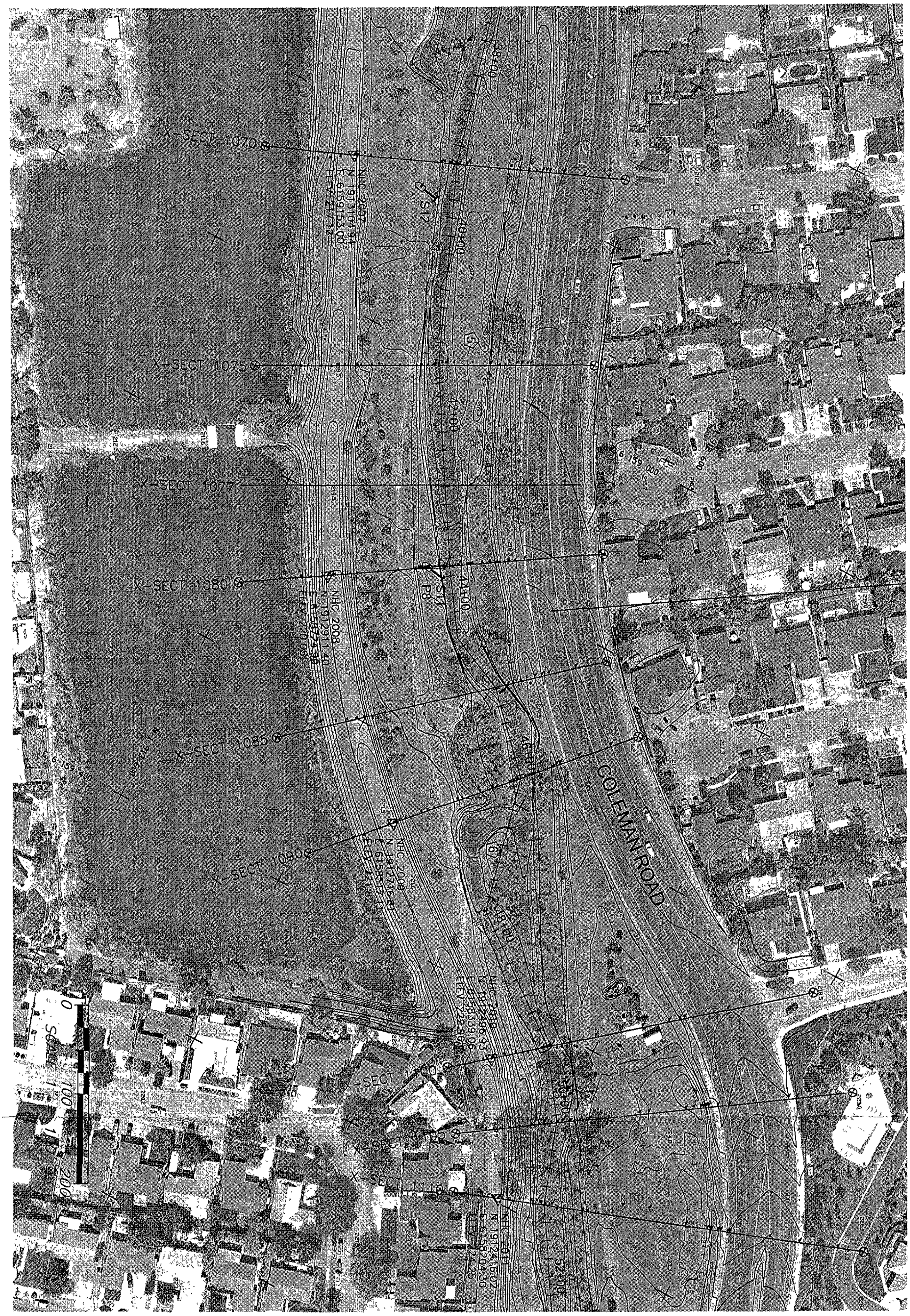
Sheet 4 of 9



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Sheet 5 of 9

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SANTA CLARA COUNTY, CA

GROUND SURVEY CROSS SECTION LOCATIONS

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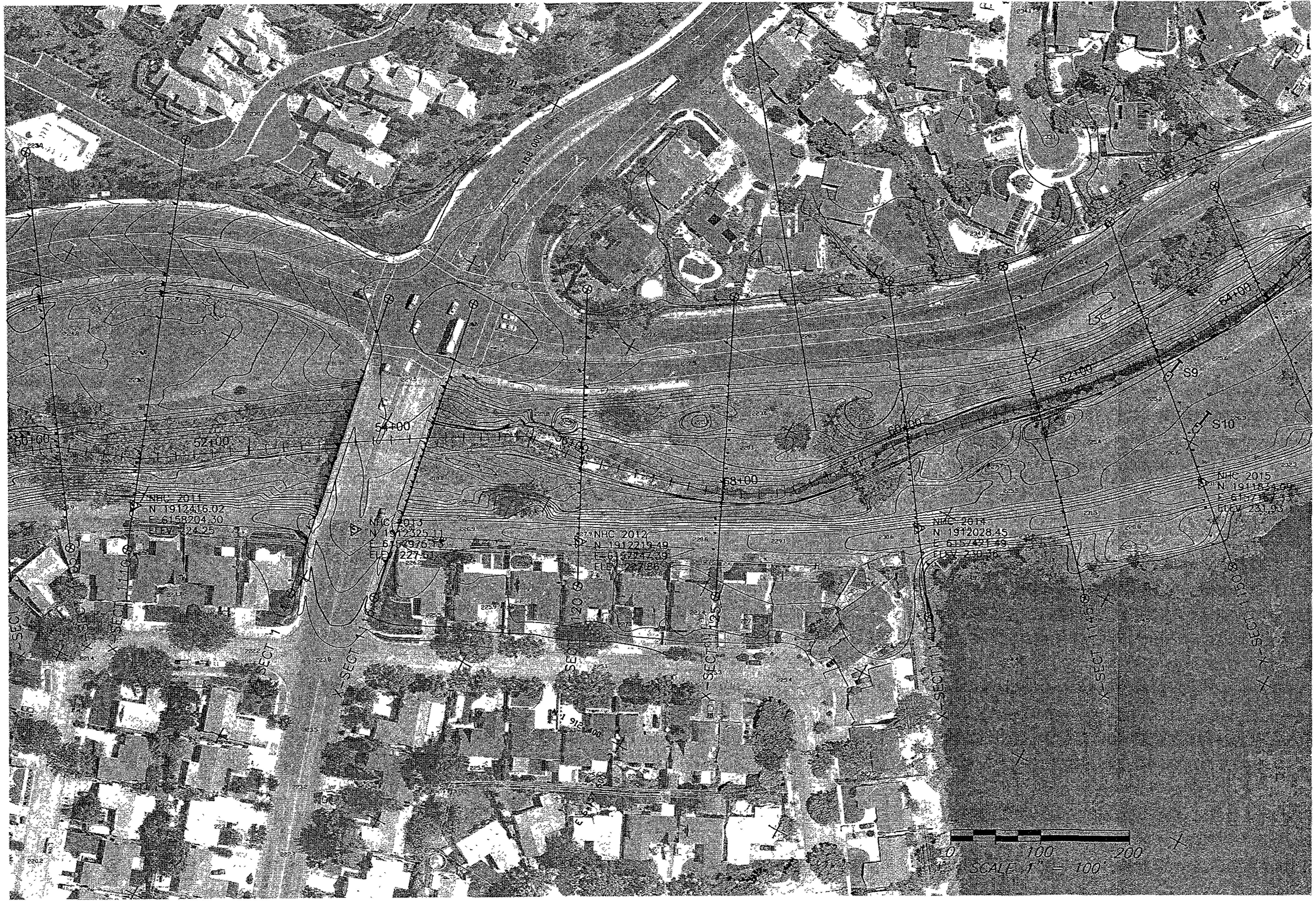

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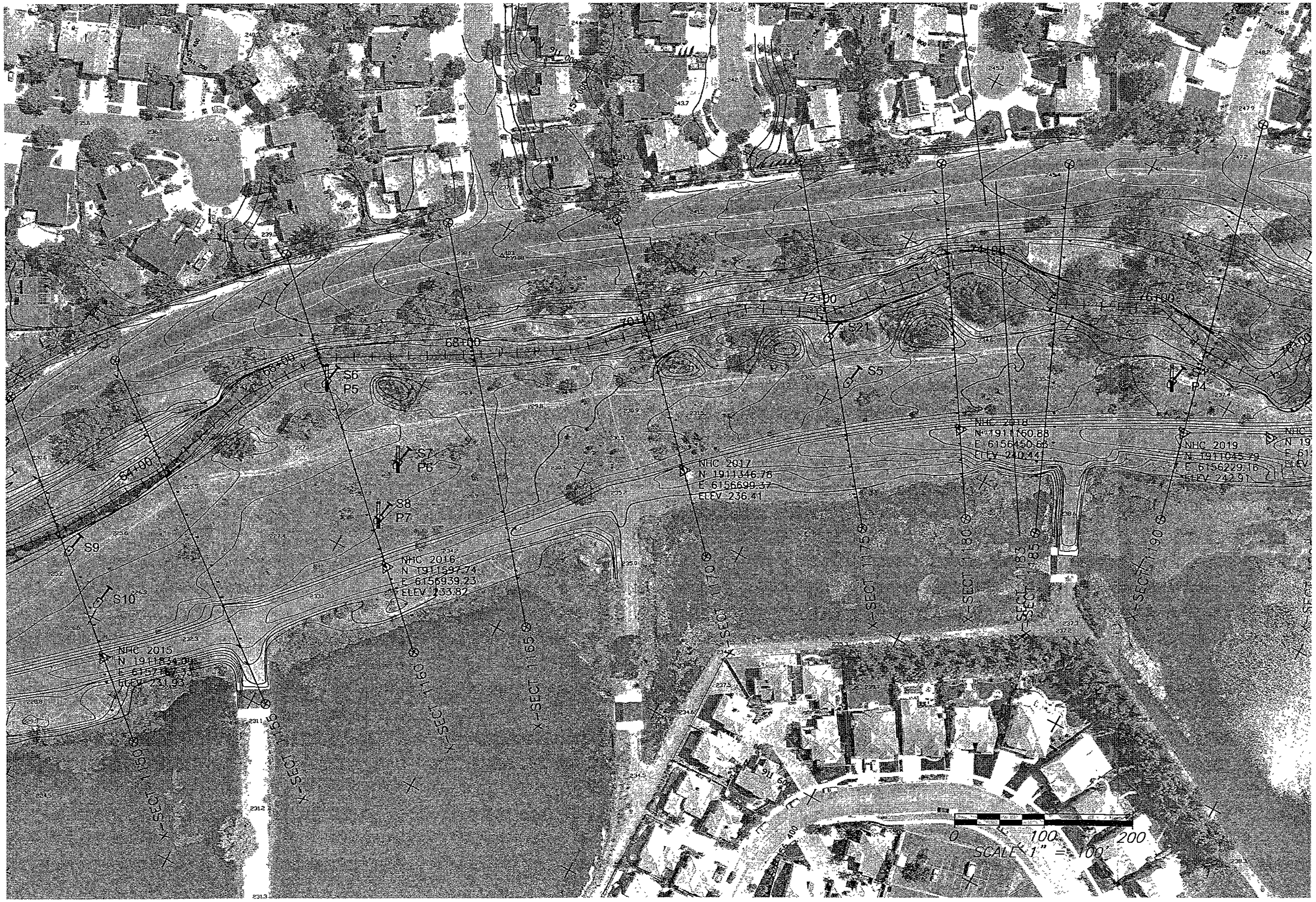

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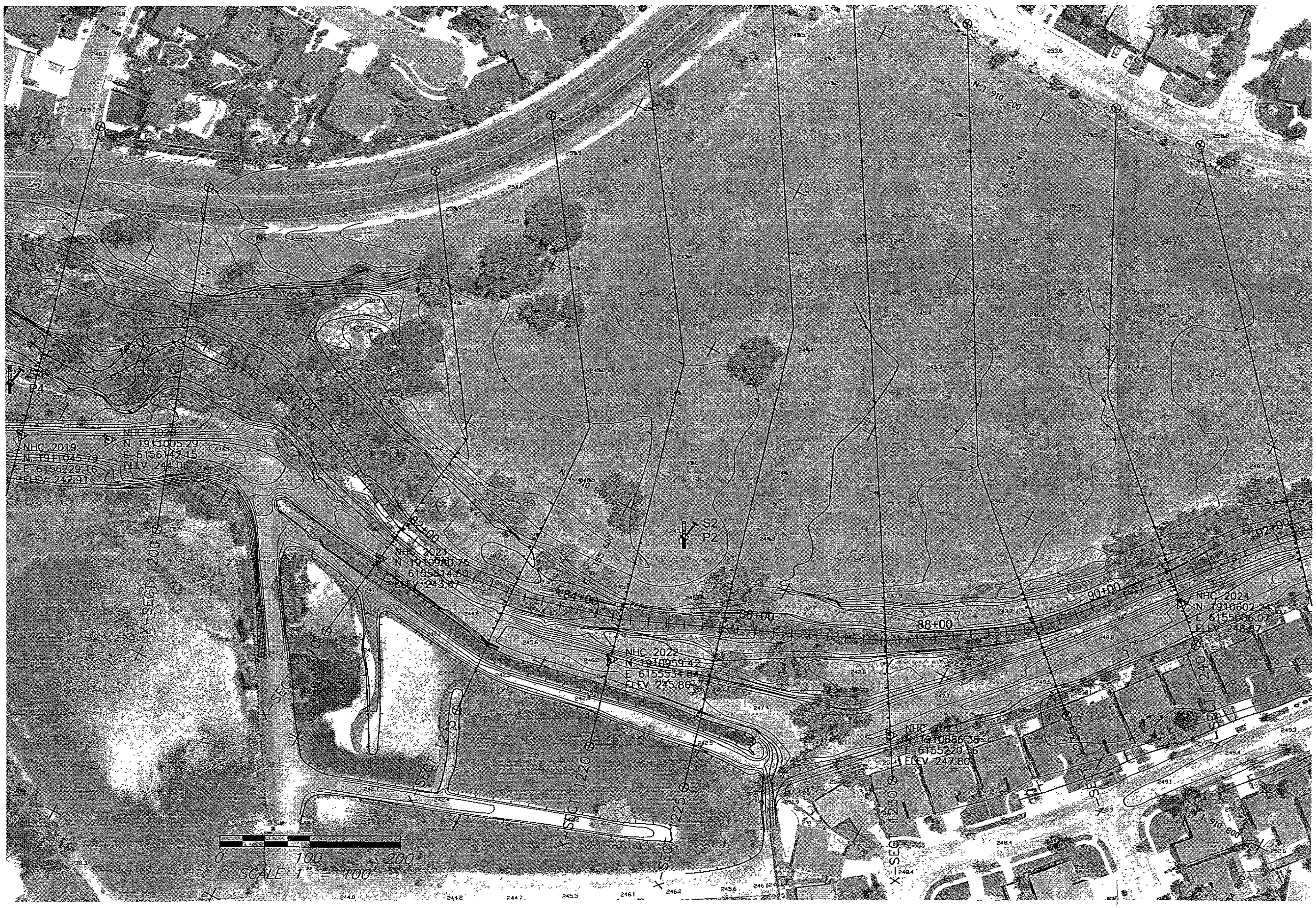

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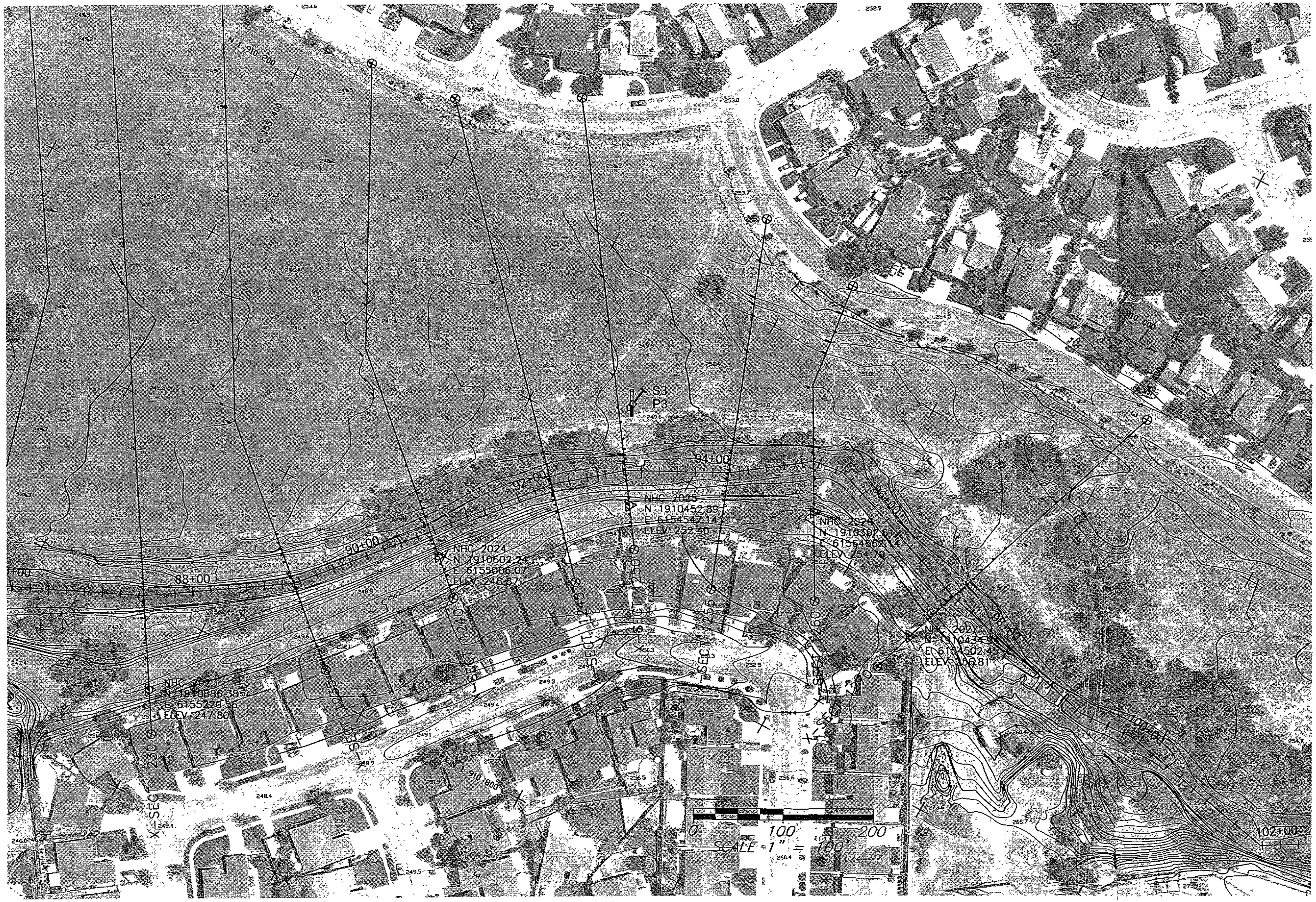

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GUADALUPE CREEK
SANTA CLARA COUNTY, CA

GROUND SURVEY CROSS SECTION LOCATIONS

NOVEMBER 18- 24 SURVEY

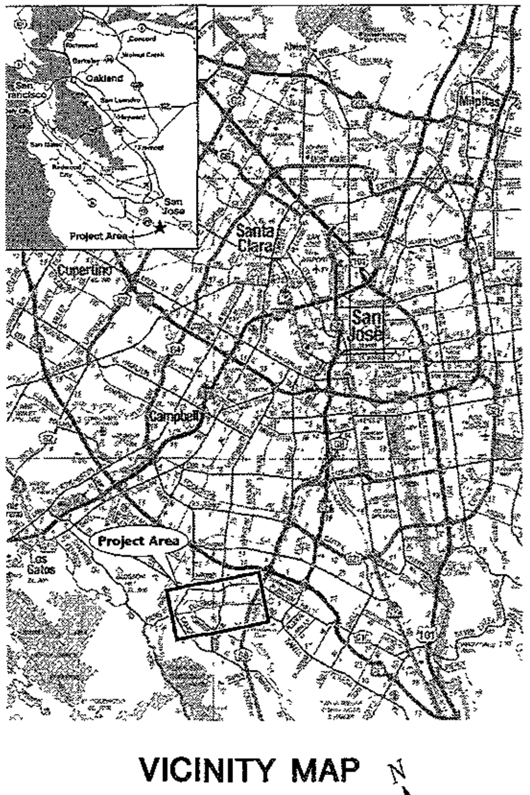
Sheet
reference
number

Sheet 9 of 9

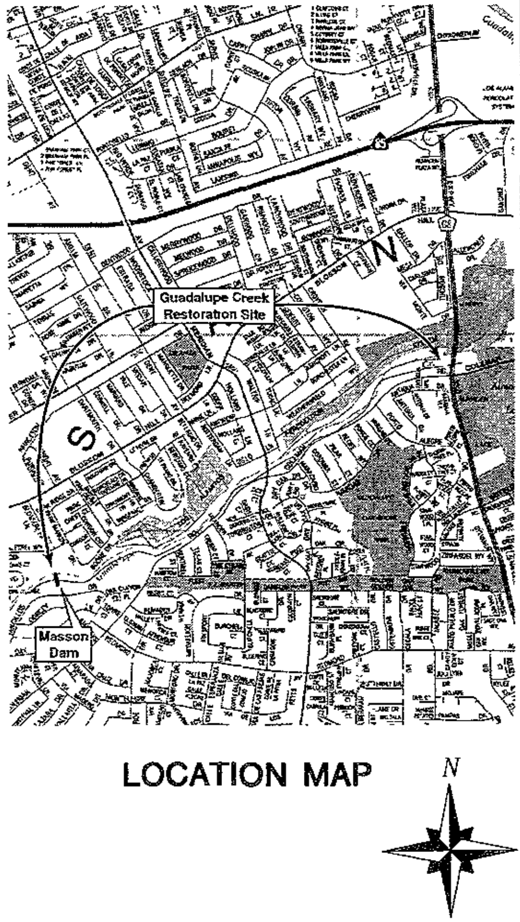
Appendix C. Draft Submittal–Guadalupe Creek Restoration Plans

SHEET INDEX

SHEET #	SHEET NAME
	COVER SHEET
GEN-1	SITE ACCESS, HAUL ROUTES, STAGING AREAS, & GENERAL NOTES
GEN-2	LEGEND & SURVEY CONTROL DATA
G-1	GRADING PLAN
G-2	GRADING PLAN
G-3	GRADING PLAN
G-4	GRADING PLAN
G-5	GRADING PLAN
G-6	GRADING PLAN
G-7	GRADING PLAN
G-8	GRADING PLAN
G-9	GRADING PLAN
G-10	GRADING PLAN
G-11	GRADING PLAN
G-12	GRADING PLAN
G-13	GRADING PLAN
G-14	GRADING PLAN
G-15	GRADING PLAN
G-16	GRADING PLAN
G-17	GRADING PLAN
G-18	GRADING PLAN
I-1	IRRIGATION PLAN
P-1	PLANTING PLAN
P-2	PLANTING PLAN
P-3	PLANTING PLAN
P-4	PLANTING PLAN
P-5	PLANTING PLAN
P-6	PLANTING PLAN
P-7	PLANTING PLAN
P-8	PLANTING PLAN
P-9	PLANTING PLAN
P-10	PLANTING PLAN
P-11	PLANTING PLAN
P-12	PLANTING PLAN
P-13	PLANTING PLAN
P-14	PLANTING PLAN
P-15	PLANTING MATRIX
D-1	INSTREAM STRUCTURES DETAILS
D-2	INSTREAM STRUCTURES DETAILS
D-3	INSTREAM STRUCTURES DETAILS
D-4	INSTREAM STRUCUTRES DETAILS
D-5	INSTREAM STRUCUTRES DETAILS
D-6	CHANNEL REALIGNMENT DETAILS
D-7	CHANNEL REALIGNMENT DETAILS
D-8	PLANTING DETAILS
D-9	PLANTING DETAILS
XS-1	CROSS-SECTIONS



VICINITY MAP



LOCATION MAP

PROJECT LOCATION

MAP AND CONSTRUCTION PLAN

FOR

GUADALUPE CREEK RESTORATION PROJECT

PROJECT NO. 301517 0629

JULY 17, 2000

PROJECT APPROVAL:

ASSISTANT OPERATING OFFICER
GUADALUPE WATERSHED
WATERSHED MANAGEMENT DIVISION

ACCEPTED BY DISTRICT:

SENIOR PROJECT MANAGER
PROJECT MANAGEMENT UNIT

DATE: ____________

Santa Clara Valley Water District

PROJECT PREPARED BY:

Jones & Stokes
2880 Zanker Rd., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430

**DRAFT SUBMITTAL
NOT FOR CONSTRUCTION**

ENGINEERING APPROVAL:

JOHN ZANZI
JONES & STOKES

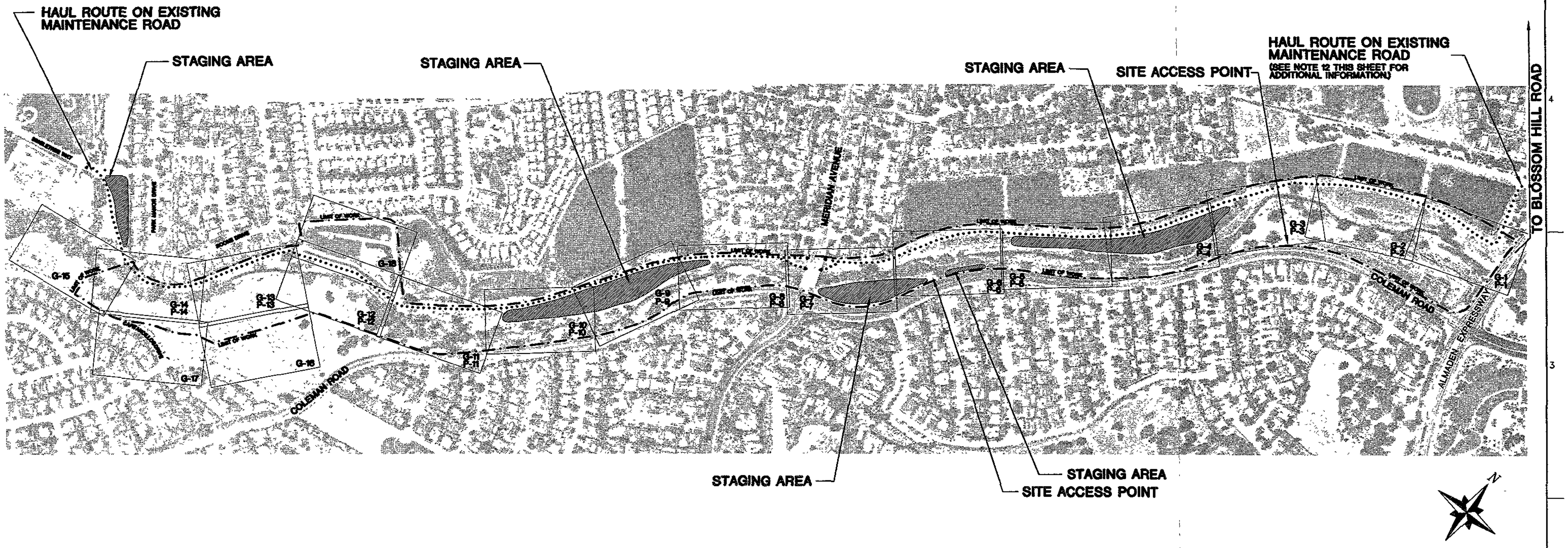
CALIFORNIA LICENSED
LANDSCAPE ARCHITECT NO 2933

DATE: ____________

ED WALLACE
RCE NO. 32301
NORTHWEST HYDRAULIC CONSULTANTS

DATE: ____________

FILE NAME:
DATE:



GENERAL NOTES:

1. THESE CONSTRUCTION DOCUMENTS HAVE BEEN PREPARED USING THE BEST AVAILABLE INFORMATION WITHIN ACCEPTED INDUSTRY STANDARDS.

2. THE CONTRACTOR WILL CONTACT THE ENGINEER IMMEDIATELY UPON FINDING ANY FIELD CONDITIONS THAT WOULD CONFLICT WITH THE INFORMATION INDICATED ON THESE DRAWINGS. ALL FIELD ADJUSTMENTS MUST BE APPROVED BY THE ENGINEER BEFORE CONSTRUCTION OF SAID ADJUSTMENTS; FAILURE TO DO SO WILL RESULT IN THE CONTRACTOR ASSUMING FULL RESPONSIBILITY FOR ANY REQUIRED REVISIONS OR FIELD MODIFICATIONS, AS DIRECTED BY THE ENGINEER, AT NO ADDITIONAL COST.

3. THE CONTRACTOR WILL BE RESPONSIBLE FOR COORDINATING THE SCHEDULING OF CONSTRUCTION OPERATIONS WITH CONSTRUCTION OPERATIONS OF OTHERS WORKING ON OR NEAR THE PROJECT SITE.

4. THE CONTRACTOR WILL VERIFY THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES BEFORE ANY CONSTRUCTION OPERATIONS. TO FIELD-LOCATE ALL EXISTING UTILITIES, THE CONTRACTOR WILL CALL ALL GOVERNING AGENCIES AND UNDERGROUND *SERVICE ALERT (U.S.A.) AT 1-(800)-642-2444.*

5. THE CONSTRUCTION STAGING AREAS WILL BE AT THE LOCATIONS SHOWN ON THE DRAWINGS, AND IN OTHER AREAS APPROVED BY THE ENGINEER. ACCESS AND HAUL ROUTES WILL BE LIMITED TO THOSE SHOWN IN THE DRAWINGS, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

6. THE CONTRACTOR WILL BE RESPONSIBLE FOR TAKING APPROPRIATE PRECAUTIONS TO MINIMIZE THE CHANCE OF FIRE AT THE PROJECT SITE. THE CONTRACTOR WILL USE EXISTING DIRT ROADS, OR OTHER AREAS WITH WEEDS AND OTHER PLANT GROWTH WITH A HEIGHT OF LESS THAN 6 INCHES FOR CONSTRUCTION ACCESS. EACH VEHICLE WILL BE EQUIPPED WITH A MINIMUM OF ONE FIRE EXTINGUISHER AND ONE SHOVEL. GASOLINE WILL BE STORED IN SEALED METAL CANS LABELED "FLAMMABLE". NO BURNING WILL BE PERMITTED AT THE PROJECT SITE. VEHICLE AND EQUIPMENT PARKING WILL BE LIMITED TO THE CONSTRUCTION STAGING AREAS PER THE LOCATION INDICATED ON THE DRAWINGS. THE CONTRACTOR WILL SCRAPE AND CLEAN THE LIMITS OF THE CONSTRUCTION STAGING AREAS TO BE VEGETATION FREE ACCORDING TO THE ENGINEER'S DIRECTION. THROUGHOUT THE CONTRACT PERIOD, THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING THE CONSTRUCTION STAGING AREAS FREE OF WEEDS AND OTHER PLANT GROWTH OF A HEIGHT GREATER THAN 6 INCHES. FOR THIS CONTRACT, THE FIRE DANGER SEASON IS DEFINED AS EXTENDING FROM MAY 1 TO OCTOBER 31 OF EACH YEAR COVERED BY THIS CONTRACT, AND AT ANY OTHER TIMES IF CONDITIONS WARRANT AS DETERMINED BY THE ENGINEER.

7. ALL LUBRICATION, REFUELING, OR MAINTENANCE OF EARTHMOVING OR OTHER *CONSTRUCTION VEHICLES WILL BE DONE WITHIN APPROVED CONSTRUCTION STAGING* AREAS.

8. THE CONTRACTOR WILL BE RESPONSIBLE FOR KEEPING THE PROJECT SITE IN A NEAT AND ORDERLY CONDITION, FREE OF RUBBISH AND DEBRIS, AT ALL TIMES.

9. THE CONTRACTOR WILL SPRAY ALL UNPAVED CONSTRUCTION AREAS WITH WATER AT LEAST THREE TIMES EACH DAY WITHIN AREAS BEING GRADED, EXCAVATED OR USED AS CONSTRUCTION HAUL ROADS; SPRAYING WILL OCCUR MORE FREQUENTLY ON HOT AND WINDY DAYS.

10. ELEVATIONS SHOWN ON THE DRAWINGS ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29). BASELINE AND CONTROL DATA ARE SHOWN ON SHEET GEN-2. ALL BENCH MARKS AND MONUMENTS SHOWN ON THE DRAWINGS MUST BE PROTECTED AND PRESERVED THROUGHOUT THE CONTRACT PERIOD.

11. *EXISTING CONDITIONS SHOWN ON THE DRAWINGS ARE BASED ON AERIAL* PHOTOGRAPHY DATED SEPTEMBER 22, 1999, AND FIELD SURVEYS DATED MAY 29TH, 2000. ACTUAL CONDITIONS AT THE TIME OF CONSTRUCTION MAY VARY FROM THOSE SHOWN.

12. THE DOWNSTREAM END OF THE PROJECT SITE IS ACCESSIBLE BY WAY OF A MAINTENANCE ROAD AND GATE LOCATED OFF ALMADEN EXPRESSWAY, BETWEEN COLEMAN ROAD (SOUTH) AND BLOSSOM HILL ROAD (NORTH), APPROXIMATELY 500 FEET *NORTH OF THE CREEK.*

13. SITE ACCESS POINTS WILL BE USED FOR EQUIPMENT ACCESS TO SPECIFIC AREAS OF WORK. GENERAL DELIVERY OF MATERIALS TO THE SITE WILL NOT BE PERMITTED THROUGH THESE POINTS.

14. ACCESS THROUGH GATES ON THE MAINTENANCE ROAD AT MERIDIAN AVENUE WILL BE LIMITED TO PICK-UP TRUCKS AND PASSENGER VEHICLES.

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

Jones & Stokes
2880 Zanker Rd., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard, suite 100c
west sacramento california 95691-3430

CONSULTANT STAMP

CONSULTANT STAMP

DATE 07/14/00
DESIGN BPH
DRAWN BPH
CHECKED JAZ

Santa Clara Valley Water District
ACCEPTED BY DISTRICT
DATE

GUADALUPE CREEK RESTORATION PROJECT
SITE ACCESS, HAUL ROUTES, STAGING AREAS, & GENERAL NOTES

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE 1"=280'
SHEET
GEN-1
2 OF 47

CONTROL DATA

POINT #	NORTH	EAST	ELEV.	DESC.
100	1914828.55	6161008.08	198.34	BRASS PIN MON
101	1913755.25	6161444.93	202.20	FD. PK NAIL
102	1912047.83	6159050.17	217.07	SET PK NAIL
103	1911230.07	6156990.53	239.08	SET MAG NAIL
104	1909617.25	6154716.49	253.44	SET MAG NAIL
105	1911161.71	6154001.72	273.31	SET LARGE NAIL
106	1912503.32	6156235.17	240.01	SET MAG NAIL
107	1913681.29	6158117.12	215.64	SET MAG NAIL

HORIZONTAL DATUM : NAD83
VERTICAL DATUM: NGVD29, US FEET

BASE LINE DATA

STATION	BEARING	LENGTH	DELTA	RADIUS
0+00				
	N82°32'13"W	175.51'		
B.C.1+75.51				
		1361.60'	51°44'58"	1507.53'
E.C.15+37.11				
	S40°58'50"W	455.77'		
B.C.19+92.88				
		597.84'	23°58'30"	1428.74'
E.C.25+90.72				
	S65°46'28"W	420.34'		
B.C.30+11.06				
		496.92'	27°17'40"	1043.11'
E.C.35+07.98				
	S35°58'24"W	162.86'		
B.C.36+70.84				
		164.69'	28°55'48"	326.17'
E.C.38+35.53				
	S64°54'12"W	788.34'		
B.C.46+23.87				
		445.96'	18°36'53"	1372.68'
E.C.50+69.83				
	S43°33'52"W	532.84'		
B.C.56+02.67				
		571.21'	17°59'13"	1819.54'
E.C.61+73.88				
	S63°48'10"W	315.44'		
B.C.64+89.32				
		204.13'	39°3'35"	299.43'
E.C.66+93.45				
	S77°8'15"W	120.34'		
B.C.68+13.79				
		185.18'	24°38'30"	430.58'
E.C.69+98.97				
	S80°51'55"W	271.51'		
B.C.72+70.48				
		66.41'	38°4'2"	99.95'
E.C.73+36.89				
	S40°35'5"W	344.69'		
B.C.76+81.58				
		337.99'	26°28'39"	731.4'
E.C.80+19.57 B.C.80+19.57				
		351.19'	69°8'54"	291.34'
E.C.83+70.76				

LEGEND

SYMBOL	DESCRIPTION
△	SURVEY MONUMENT
253.7	AERIAL SURVEY SPOT ELEVATION
•	FIELD SURVEYED SPOT ELEVATION
— —	INTERMEDIATE CONTOUR
— —	INDEX CONTOUR
——	PROPOSED CONTOUR
231.5	PROPOSED SPOT ELEVATION
231.5(C) 234.0(C)	GRADING CATCH POINT
68+00	BASE LINE
— X —	VEGETATION PRESERVATION FENCE
⬡	REMOVE VEGETATION
T1	TRANSPLANT EXISTING VEGETATION
—o—o—	EXISTING CHAIN-LINK FENCE
—E—	EXISTING ELECTRIC UTILITY LINE
—W—	EXISTING CITY WATER MAIN
— · · —	LOW-FLOW EDGE OF WATER
—o—o—	PROPOSED CHAIN-LINK FENCE
POST	POST
18+85	CROSS SECTION
1/D-6	DETAIL OR SECTION CALLOUT
▨	BANK PROTECTION SITE

LEGEND

SYMBOL	DESCRIPTION	DETAIL
V	BAR INSTREAM WOODY MATERIAL (IWM)	1/D-2
	LOG STREAM BARB	4/D-1
ooooo	WATER'S EDGE TREATMENT	2/D-1
	OFF-BANK BRANCH COVER	3/D-2
	OFF-BANK LOG COVER	2/D-2
	OVERBANK WOODY MATERIAL (OWM)	3/D-3
	ROOTWAD BANK STRUCTURE-TYPE 1	1/D-3
	ROOTWAD BANK STRUCTURE-TYPE 2	2/D-3
	STREAMBANK IWM	3/D-1
⊢⊣	LOG TOE BANK STRUCTURE	1/D-4
V	WING DEFLECTOR	4/D-3
oooo	ROCK STREAM BARB	2/D-4
^	V-WEIR	1/D-5
	CROSS-WEIR	2/D-5
▨	BURIED GROIN	3/D-5
	STREAM BOULDER PLACEMENT	1/D-1

ABBREVIATIONS

ABBREV.	DESCRIPTION
IWM	INSTREAM WOODY MATERIAL
OWM	OVERBANK WOODY MATERIAL
CMP	CORRIGUATED METAL PIPE
RCP	REINFORCED CONCRETE PIPE
B.C.	BEGINNING OF CURVE
E.C.	END OF CURVE
F.D.	FOUND
MAG NAIL	MAGNESIUM NAIL
MON	MONUMENT
LF	LINEAR FEET
MIN	MINIMUM
ELEV.	ELEVATION
NAD	NORTH AMERICAN DATUM
NGVD	NATIONAL GEODETIC VERTICAL DATUM
DESC.	DESCRIPTION

TRANSPLANT AND REMOVAL LIST

SHEET	AREA	PLANT NAME	NUMBER	HEIGHT	DIAMETER	COMMENTS
G-2	T1					
	T2					
G-3	T2	WILLOW	1			
G-4	T1					
	T2					
G-5	T1	SYCAMORE	4	1'-2'		
		WILLOW	20	3'-8'		
	T2	WILLOW	5	3'-8'		
	T3	SYCAMORE	1	2'		
		WILLOW	1	12'		
	R1	MYRTLE				
	R2	MYRTLE				
G-6	T1					
	T2	WILLOW				
	T3	SYCAMORE	1	2'		
	R1	SPECIES				
G-7	T1	WILLOW		3'		
	R1	SYCAMORE				SALVAGE 1-3 TRUNKS@12" DIA.
	R2	SCOTCH BROOM				
G-8	T1					
	T2	MULEFAT	4	10'-15'	AS SHOWN	
	T3	MULEFAT	1	10'-15'	AS SHOWN	
	T4	MULEFAT	3	10'-15'		
	T5	MULEFAT	1	10'-15'		
G-9	T1	MULEFAT	1	10'-15'		
	T2					
	T3	MULEFAT	1	8'	AS SHOWN	
G-10	T1	MULEFAT	1	10'-15'		
	T2	MULEFAT	1	10'-15'		
	T3	MULEFAT	3	10'		
	T4	BUCKEYE	1	5'		
	R1	WALNUT	MULTI-TRUNK	20'	3@7", 10@3"	
	R2	WALNUT	MULTI-TRUNK	20'	ALL@3"	
	R3	SYCAMORE	1			STOCKPILE ROOTWAD & TRUNKS
	R4	SYCAMORE	2 TRUNKS			STOCKPILE ROOTWAD & TRUNKS (2)
G-13	T1	MULEFAT	6			
	T2	PHASE 1 PLANTING	23			
	T3	PHASE 1 PLANTING	57			
	T4	MULEFAT				
	T5	MULEFAT				
	R1	POISON OAK				
	R2	OAK				USE AS IWM
	R3	WILD ROSE				
	R4	POISON OAK				
	R5	OAK				USE AS IWM
G-14	T1	ELDERBERRY	2		1@10'-15', 1@5'-10'	
	T2	ELDERBERRY	1		10'-15'	
	T3	MULEFAT				
	T4	ELDERBERRY	1		10'-15'	

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

Jones & Stokes
2880 Zanker Rd., San Jose CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard suite 100c
west sacramento, california 95691-3430

CONSULTANT STAMP

CONSULTANT STAMP

DATE	07/14/00
DESIGN	BPH
DRAWN	BPH
CHECKED	JAZ

Santa Clara Valley Water District

ACCEPTED BY DISTRICT

DATE

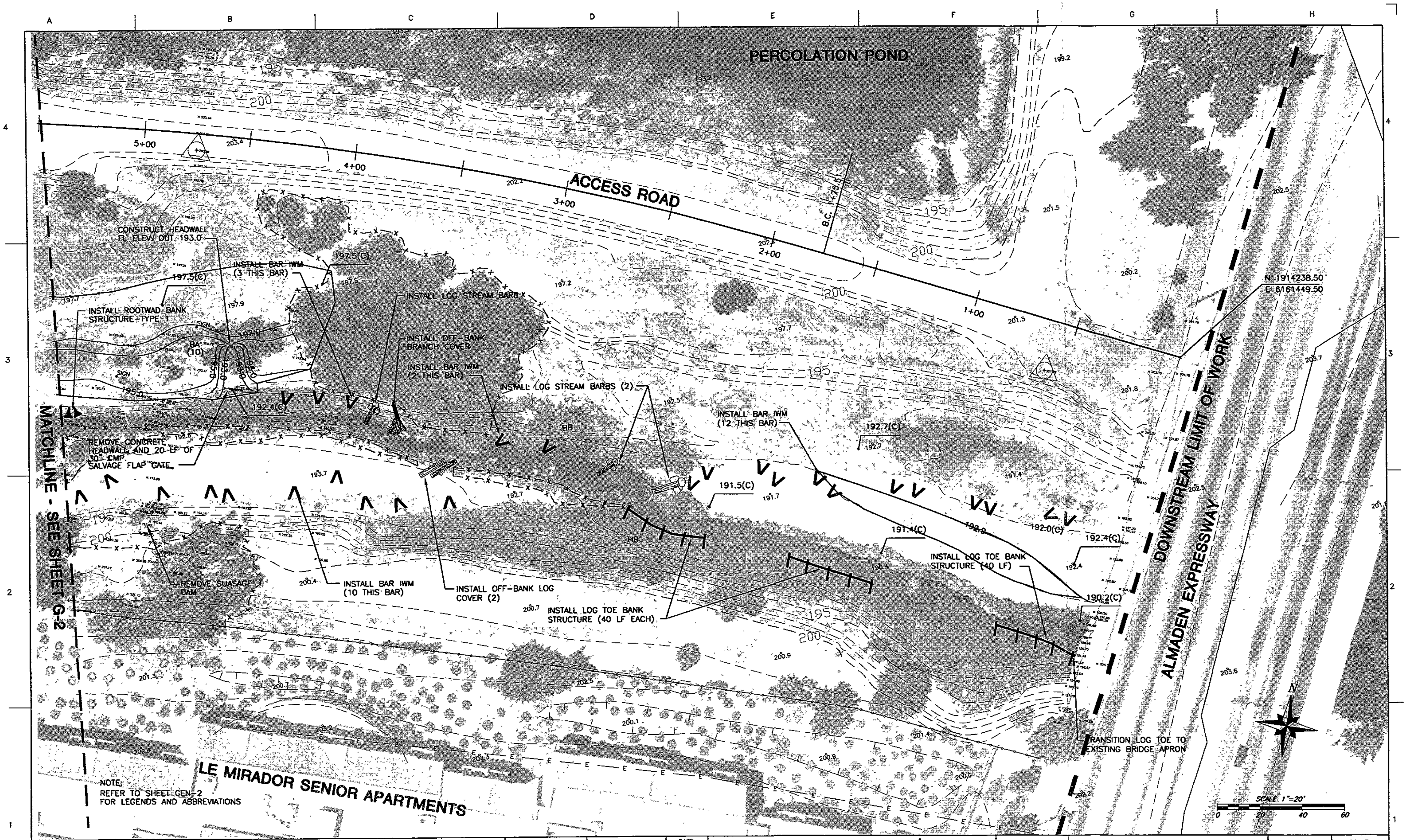
GUADALUPE CREEK RESTORATION PROJECT

LEGEND & SURVEY CONTROL DATA

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE
1"=280'

SHEET
GEN-2
3 OF 47


PERCOLATION POND
ACCESS ROAD
5+00
4+00
3+00
2+00
1+00
B.C. 1+75.5
195
200
CONSTRUCT HEADWALL FL ELEV OUT 193.0
INSTALL BAR IWM (3 THIS BAR)
197.5(C)
INSTALL ROOTWAD BANK STRUCTURE-TYPE 1
INSTALL LOG STREAM BARB
INSTALL OFF-BANK BRANCH COVER
INSTALL BAR IWM (2 THIS BAR)
INSTALL LOG STREAM BARBS (2)
BA (10)
SIGN
192.4(C)
REMOVE CONCRETE HEADWALL AND 20 LF OF 30" CMP SALVAGE FLAP GATE
MATCHLINE - SEE SHEET G-2
HB
INSTALL BAR IWM (12 THIS BAR)
192.7(C)
191.5(C)
191.4(C)
192.0(C)
192.4(C)
190.2(C)
INSTALL LOG TOE BANK STRUCTURE (40 LF)
REMOVE SUASAGE DAM
INSTALL BAR IWM (10 THIS BAR)
INSTALL OFF-BANK LOG COVER (2)
INSTALL LOG TOE BANK STRUCTURE (40 LF EACH)
N 1914238.50
E 6161449.50
DOWNSTREAM LIMIT OF WORK
ALMADEN EXPRESSWAY
TRANSITION LOG TOE TO EXISTING BRIDGE APRON
LE MIRADOR SENIOR APARTMENTS
N
SCALE 1"=20'
0
20
40
60
A
B
C
D
E
F
G
H
1
2
3
4

NOTE:
REFER TO SHEET GEN-2
FOR LEGENDS AND ABBREVIATIONS

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

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west sacramento, california 95691-3430

CONSULTANT STAMP

CONSULTANT STAMP

DATE	07/17/00
DESIGN	JH/KC
DRAWN	BH/BK/JS
CHECKED	EW/JZ

Santa Clara Valley Water District

ACCEPTED BY DISTRICT

DATE

GUADALUPE CREEK RESTORATION PROJECT

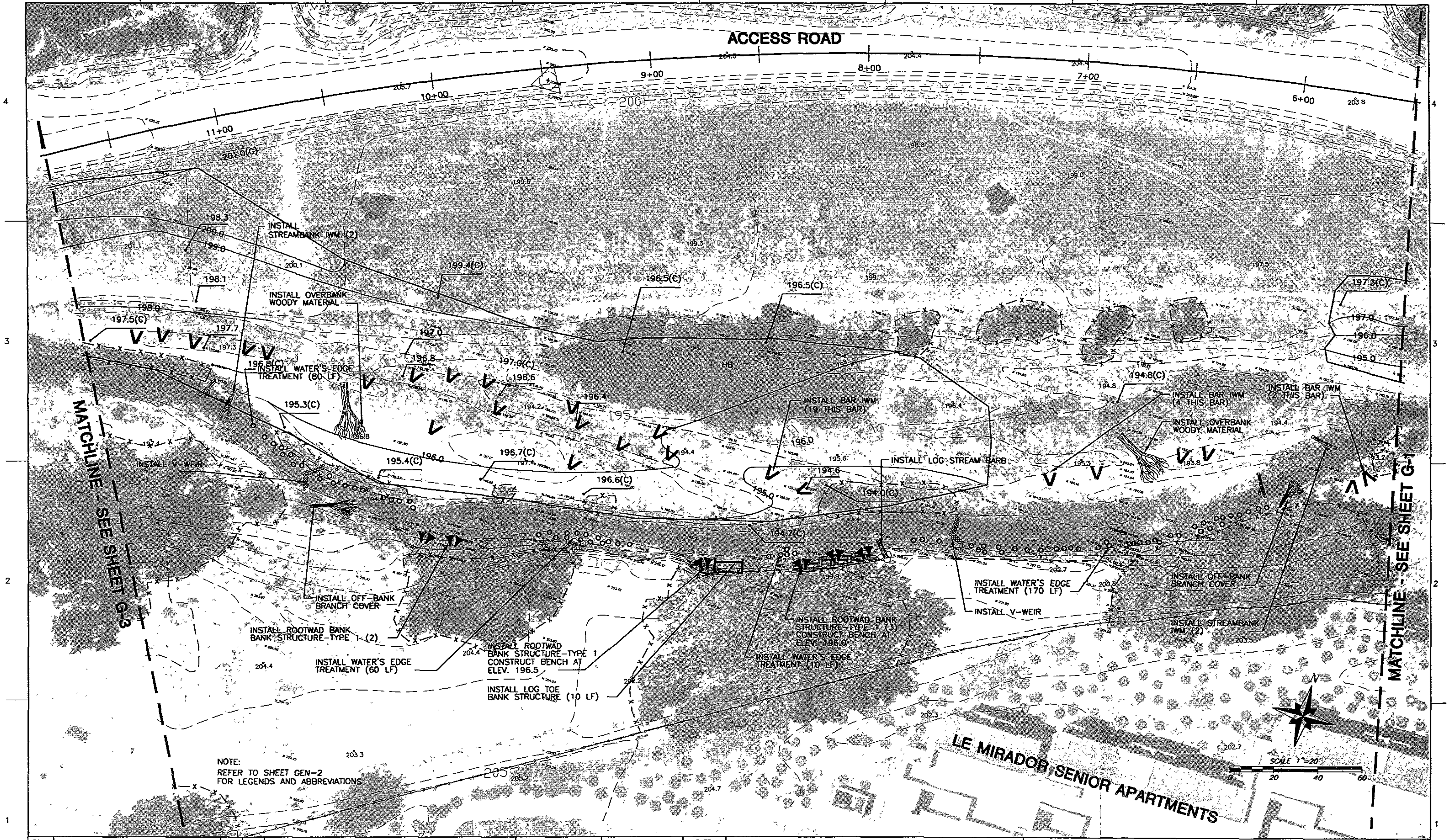
GRADING PLAN

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE
AS SHOWN

SHEET
G-1
4 OF 47

A B C D E F G H


ACCESS ROAD
11+00
10+00
9+00
8+00
7+00
6+00
200
201.0(C)
198.3
200.0
199.0
201.1
200.1
198.1
198.0
197.5(C)
197.7
197.3
199.6
199.4(C)
198.8
199.0
199.3
199.1
197.5
196.5(C)
196.5(C)
197.3(C)
197.0
196.0
195.0
INSTALL STREAMBANK IWM (2)
INSTALL OVERBANK WOODY MATERIAL
197.0
196.8
197.0(C)
196.6
196.8(C)
INSTALL WATER'S EDGE TREATMENT (80 LF)
196.4
194.2
195
HB
195.3(C)
196.8
194.4
196.0
196.7(C)
195.4(C)
196.6(C)
INSTALL V-WEIR
INSTALL BAR IWM (19 THIS BAR)
196.4
196.0
195.6
INSTALL LOG STREAM BARB
194.6
195.0
194.0(C)
194.7(C)
194.8(C)
194.8
INSTALL BAR IWM (4 THIS BAR)
INSTALL BAR IWM (2 THIS BAR)
INSTALL OVERBANK WOODY MATERIAL
194.4
195.3
193.8
193.2
199.9
202.7
200.6
INSTALL WATER'S EDGE TREATMENT (170 LF)
INSTALL V-WEIR
INSTALL OFF-BANK BRANCH COVER
INSTALL STREAMBANK IWM (2)
203.5
INSTALL OFF-BANK BRANCH COVER
INSTALL ROOTWAD BANK STRUCTURE-TYPE 1 (2)
INSTALL WATER'S EDGE TREATMENT (60 LF)
204.4
INSTALL ROOTWAD BANK STRUCTURE-TYPE 1 CONSTRUCT BENCH AT ELEV. 196.5
INSTALL LOG TOE BANK STRUCTURE (10 LF)
INSTALL ROOTWAD BANK STRUCTURE-TYPE 1 (3) CONSTRUCT BENCH AT ELEV. 196.0
INSTALL WATER'S EDGE TREATMENT (10 LF)
204.4
202.2
202.3
203.3
205
205.2
204.7
202.7
MATCHLINE - SEE SHEET G-3
MATCHLINE - SEE SHEET G-1
LE MIRADOR SENIOR APARTMENTS
N
SCALE 1"=20'
0
20
40
60

NOTE:
REFER TO SHEET GEN-2
FOR LEGENDS AND ABBREVIATIONS

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

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CONSULTANT STAMP

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DATE 07/17/00
DESIGN JH/KC
DRAWN BH/BK/JS
CHECKED EW/JZ

Santa Clara Valley Water District

ACCEPTED BY DISTRICT

DATE

GUADALUPE CREEK RESTORATION PROJECT

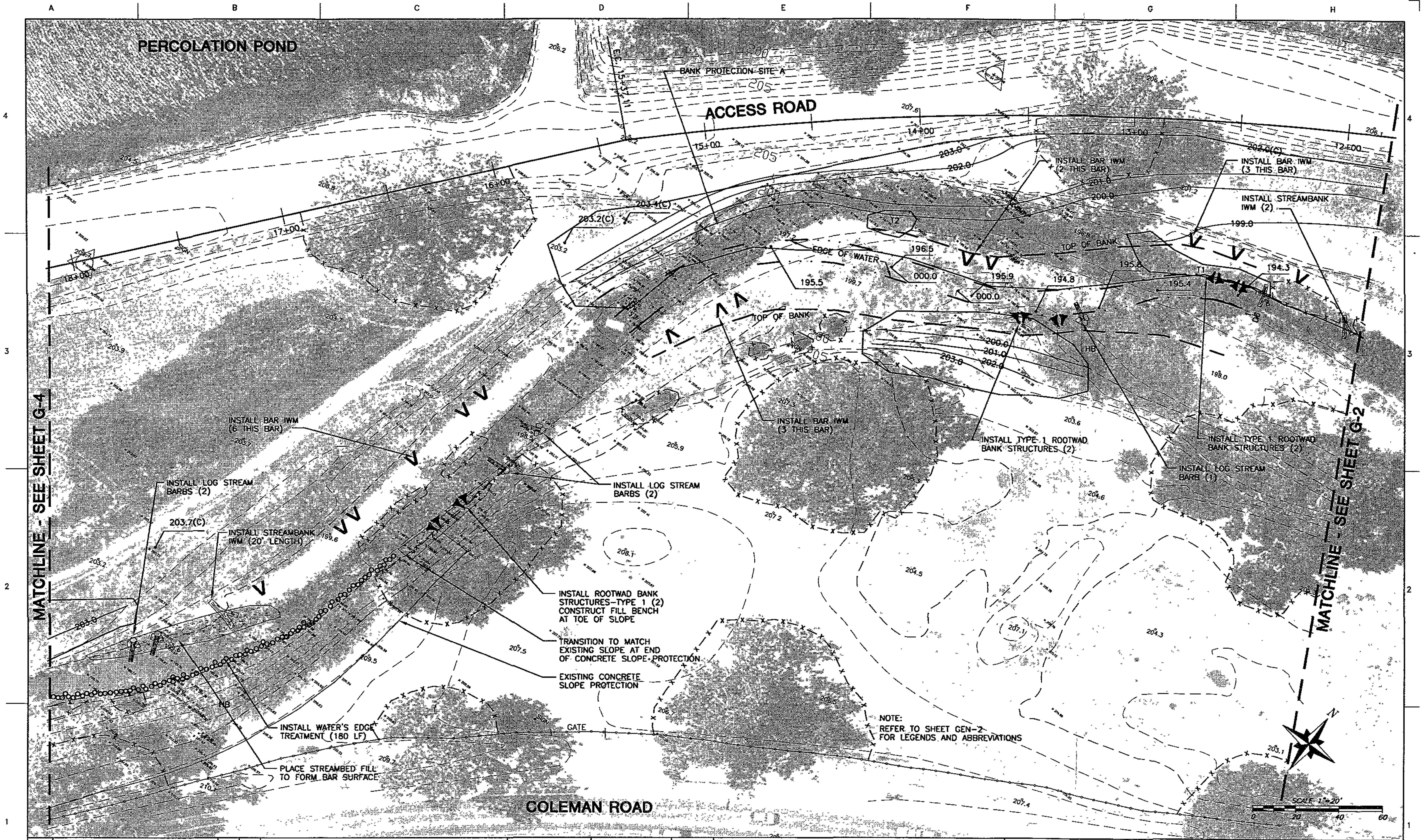
GRADING PLAN

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE AS SHOWN

SHEET G-2

5 OF 47



PERCOLATION POND
ACCESS ROAD
BANK PROTECTION SITE A
INSTALL BAR IWM (2 THIS BAR)
INSTALL BAR IWM (3 THIS BAR)
INSTALL STREAMBANK IWM (2)
TOP OF BANK
EDGE OF WATER
INSTALL BAR IWM (6 THIS BAR)
INSTALL BAR IWM (3 THIS BAR)
INSTALL TYPE 1 ROOTWAD BANK STRUCTURES (2)
INSTALL TYPE 1 ROOTWAD BANK STRUCTURES (2)
INSTALL LOG STREAM BARB (1)
INSTALL LOG STREAM BARBS (2)
INSTALL LOG STREAM BARBS (2)
INSTALL STREAMBANK IWM (20' LENGTH)
INSTALL ROOTWAD BANK STRUCTURES-TYPE 1 (2) CONSTRUCT FILL BENCH AT TOE OF SLOPE
TRANSITION TO MATCH EXISTING SLOPE AT END OF CONCRETE SLOPE PROTECTION
EXISTING CONCRETE SLOPE PROTECTION
INSTALL WATER'S EDGE TREATMENT (180 LF)
PLACE STREAMBED FILL TO FORM BAR SURFACE
GATE
COLEMAN ROAD
MATCHLINE - SEE SHEET G-4
MATCHLINE - SEE SHEET G-2
NOTE: REFER TO SHEET GEN-2 FOR LEGENDS AND ABBREVIATIONS
SCALE 1"=20'
0 20 40 60
N

REV	DESCRIPTION	DATE	APPR
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ACCEPTED BY DISTRICT

DATE

GUADALUPE CREEK RESTORATION PROJECT

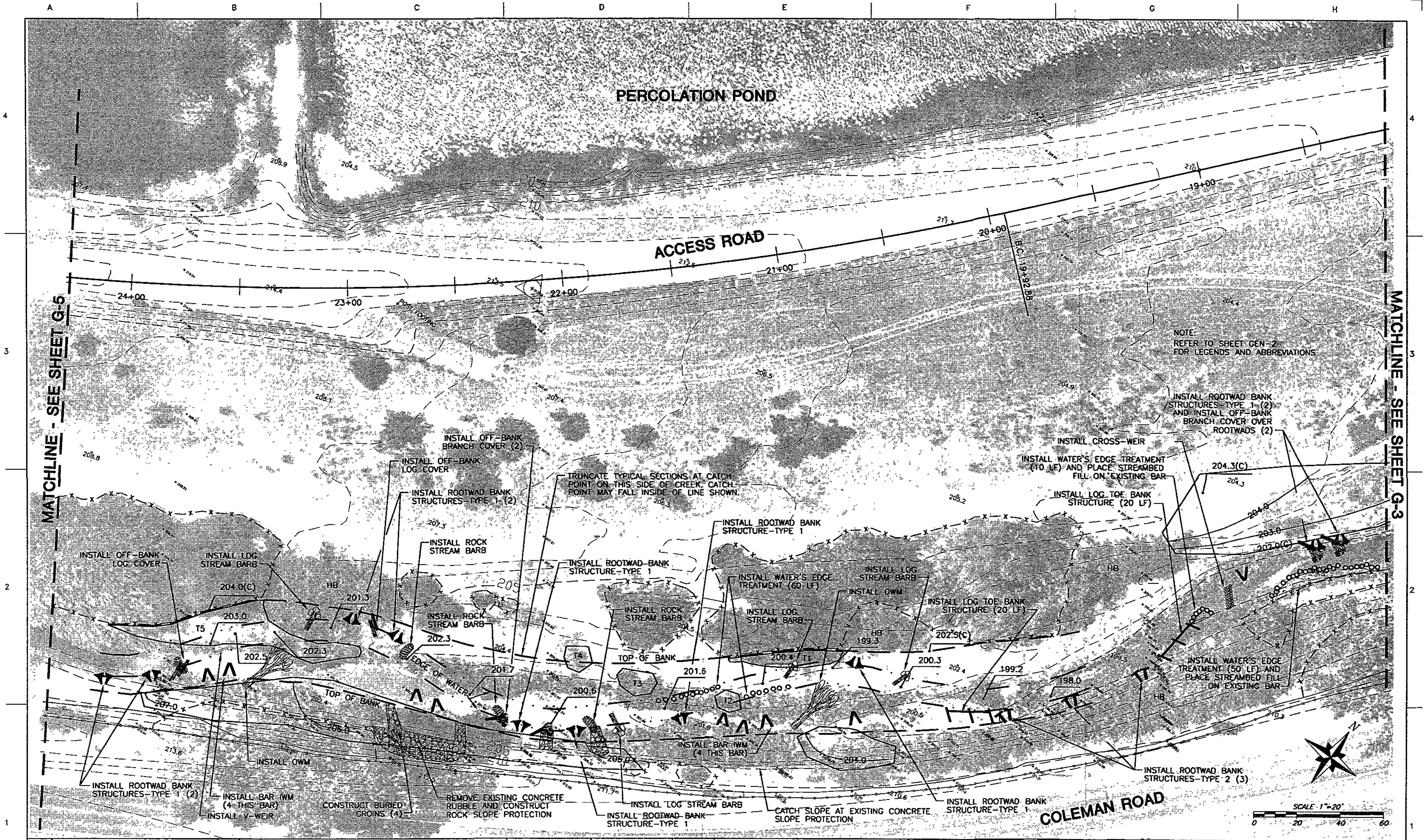
GRADING PLAN

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE AS SHOWN

SHEET G-3

6 OF 47


PERCOLATION POND
ACCESS ROAD
24+00
23+00
22+00
21+00
20+00
19+00
B.C. 19+92.88
MATCHLINE - SEE SHEET G-5
MATCHLINE - SEE SHEET G-3
NOTE:
REFER TO SHEET GEN-2
FOR LEGENDS AND ABBREVIATIONS
INSTALL OFF-BANK BRANCH COVER (2)
INSTALL OFF-BANK LOG COVER
INSTALL ROOTWAD BANK STRUCTURES-TYPE 1 (2)
TRUNCATE TYPICAL SECTIONS AT CATCH POINT ON THIS SIDE OF CREEK. CATCH POINT MAY FALL INSIDE OF LINE SHOWN.
INSTALL ROCK STREAM BARB
INSTALL ROOTWAD BANK STRUCTURE-TYPE 1
INSTALL OFF-BANK LOG COVER
INSTALL LOG STREAM BARB
INSTALL ROCK STREAM BARB
INSTALL ROCK STREAM BARB
INSTALL ROOTWAD BANK STRUCTURE-TYPE 1
INSTALL WATER'S EDGE TREATMENT (60 LF)
INSTALL LOG STREAM BARB
INSTALL OWM
INSTALL LOG STREAM BARB
INSTALL LOG TOE BANK STRUCTURE (20 LF)
INSTALL ROOTWAD BANK STRUCTURES-TYPE 1 (2) AND INSTALL OFF-BANK BRANCH COVER OVER ROOTWADS (2)
INSTALL CROSS-WEIR
INSTALL WATER'S EDGE TREATMENT (10 LF) AND PLACE STREAMBED FILL ON EXISTING BAR
INSTALL LOG TOE BANK STRUCTURE (20 LF)
INSTALL WATER'S EDGE TREATMENT (50 LF) AND PLACE STREAMBED FILL ON EXISTING BAR
INSTALL ROOTWAD BANK STRUCTURES-TYPE 2 (3)
INSTALL ROOTWAD BANK STRUCTURE-TYPE 1
CATCH SLOPE AT EXISTING CONCRETE SLOPE PROTECTION
INSTALL LOG STREAM BARB
INSTALL ROOTWAD BANK STRUCTURE-TYPE 1
INSTALL BAR IWM (4 THIS BAR)
REMOVE EXISTING CONCRETE RUBBLE AND CONSTRUCT ROCK SLOPE PROTECTION
CONSTRUCT BURIED GROINS (4)
INSTALL OWM
INSTALL ROOTWAD BANK STRUCTURES-TYPE 1 (2)
INSTALL BAR IWM (4 THIS BAR)
INSTALL V-WEIR
TOP OF BANK
EDGE OF WATER
TOP OF BANK
HB
T1
T2
T3
T4
T5
204.0(C)
203.0
202.5
202.3
202.3
201.3
201.7
200.6
201.6
200.4
199.3
200.3
202.5(C)
199.2
198.0
204.3(C)
204.0
203.0
202.0(C)
204.0
205
210
COLEMAN ROAD
N
SCALE 1"=20'
0
20
40
60

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

Jones & Stokes
2880 Zanker Rd., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430

CONSULTANT STAMP

CONSULTANT STAMP

DATE	07/17/00
DESIGN	AR/JB
DRAWN	BH/CJ/BK
CHECKED	EW/JZ

Santa Clara Valley Water District

ACCEPTED BY DISTRICT

DATE

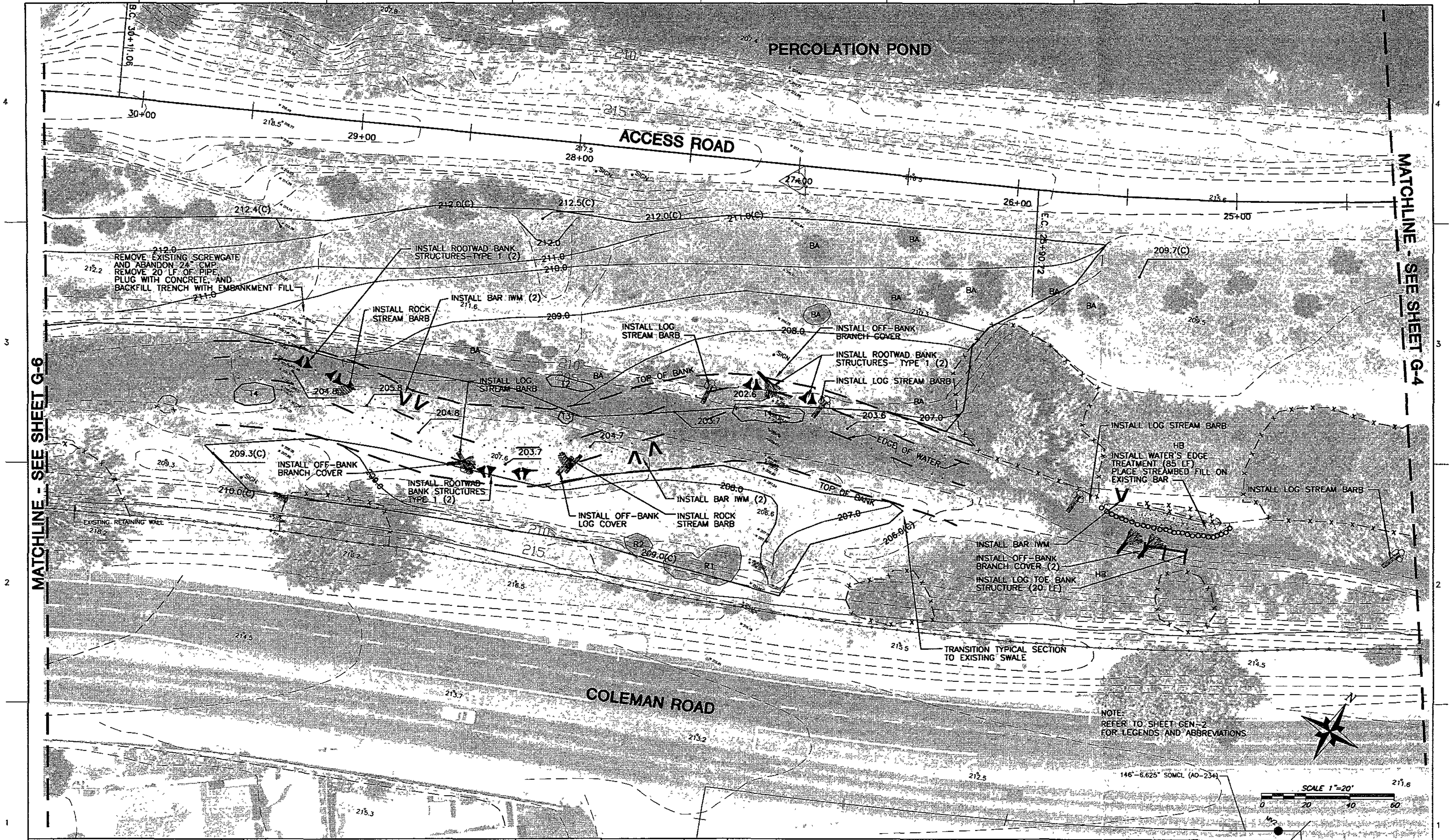
GUADALUPE CREEK RESTORATION PROJECT

GRADING PLAN

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE
AS SHOWN

SHEET
G-4
7 OF 47


PERCOLATION POND
ACCESS ROAD
COLEMAN ROAD
MATCHLINE - SEE SHEET G-6
MATCHLINE - SEE SHEET G-4
B.C. 30+11.06
30+00
29+00
28+00
27+00
26+00
25+00
E.C. 25+90.72
210
215
212.4(C)
212.0(C)
212.5(C)
212.0(C)
211.0(C)
212.0
211.0
210.0
209.0
208.0
207.0
209.7(C)
REMOVE EXISTING SCREWGATE AND ABANDON 24" CMP. REMOVE 20 LF OF PIPE, PLUG WITH CONCRETE, AND BACKFILL TRENCH WITH EMBANKMENT FILL
INSTALL ROOTWAD BANK STRUCTURES-TYPE 1 (2)
INSTALL BAR IWM (2)
INSTALL ROCK STREAM BARB
INSTALL LOG STREAM BARB
INSTALL LOG STREAM BARB
INSTALL OFF-BANK BRANCH COVER
INSTALL ROOTWAD BANK STRUCTURES- TYPE 1 (2)
INSTALL LOG STREAM BARB
INSTALL OFF-BANK BRANCH COVER
INSTALL ROOTWAD BANK STRUCTURES TYPE 1 (2)
INSTALL OFF-BANK LOG COVER
INSTALL BAR IWM (2)
INSTALL ROCK STREAM BARB
INSTALL LOG STREAM BARB
HB
INSTALL WATER'S EDGE TREATMENT (85 LF)
PLACE STREAMBED FILL ON EXISTING BAR
INSTALL LOG STREAM BARB
INSTALL BAR IWM
INSTALL OFF-BANK BRANCH COVER (2)
INSTALL LOG TOE BANK STRUCTURE (20 LF)
HB
TRANSITION TYPICAL SECTION TO EXISTING SWALE
EXISTING RETAINING WALL
TOP OF BANK
TOP OF BANK
EDGE OF WATER
209.3(C)
210.0(C)
209.0(C)
206.0(C)
204.8
205.8
204.8
204.7
203.7
203.7
202.6
203.6
206.6
T1
T2
T3
T4
R1
R2
BA
SIGN
NOTE:
REFER TO SHEET GEN-2 FOR LEGENDS AND ABBREVIATIONS
N
146'-6.625" SOMCL (AO-234)
MW2
SCALE 1"=20'
0
20
40
60

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

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2850 Zanker Rd., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard, suite 100c
west sacramento california 95691-3430

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DATE	07/17/00
DESIGN	JH/KC
DRAWN	BH/BK/JS
CHECKED	EW/JZ

Santa Clara Valley Water District

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GRADING PLAN

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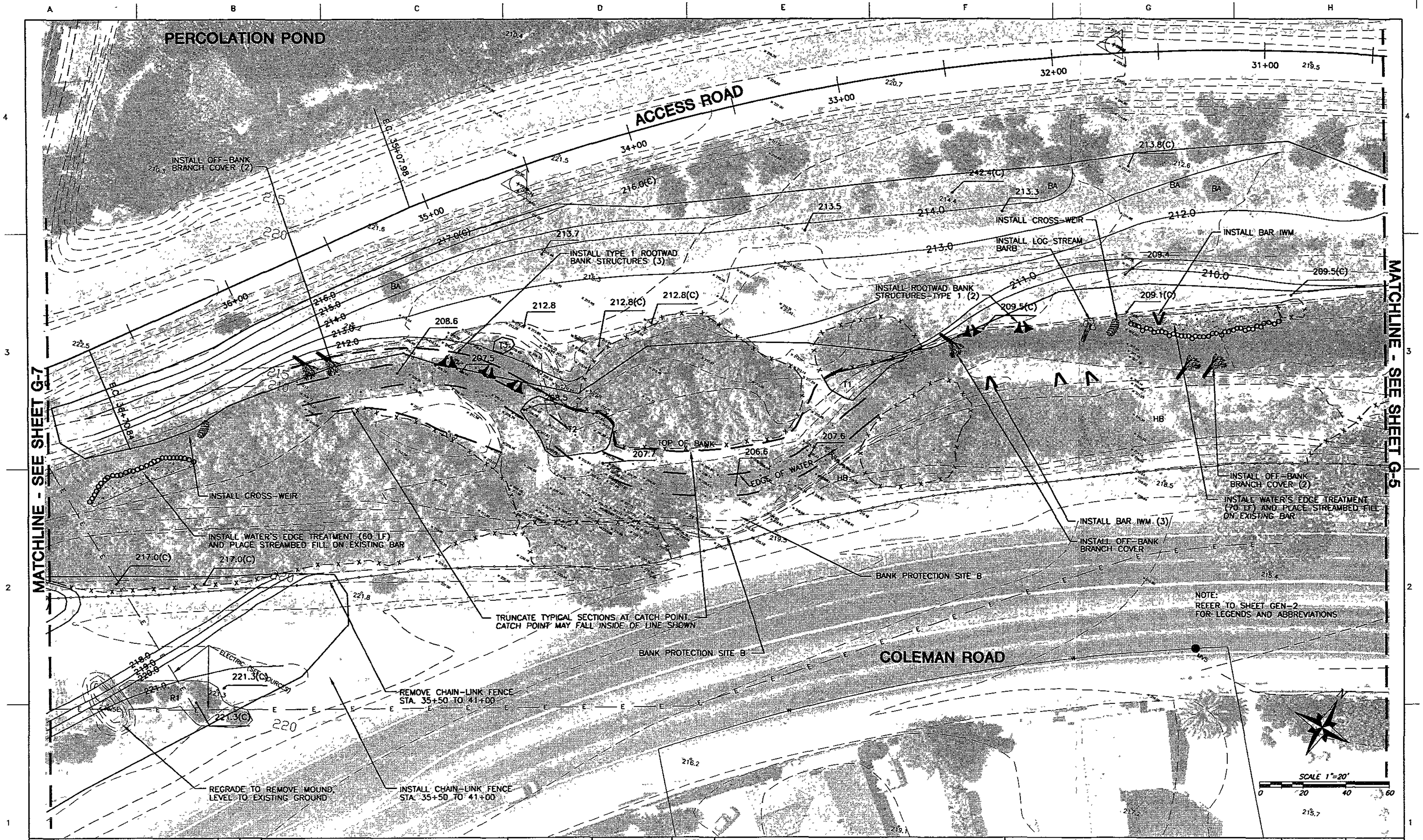
SCALE
AS SHOWN

SHEET
G-5
8 OF 47



NOTE:
REFER TO SHEET GEN-2 FOR LEGENDS AND ABBREVIATIONS

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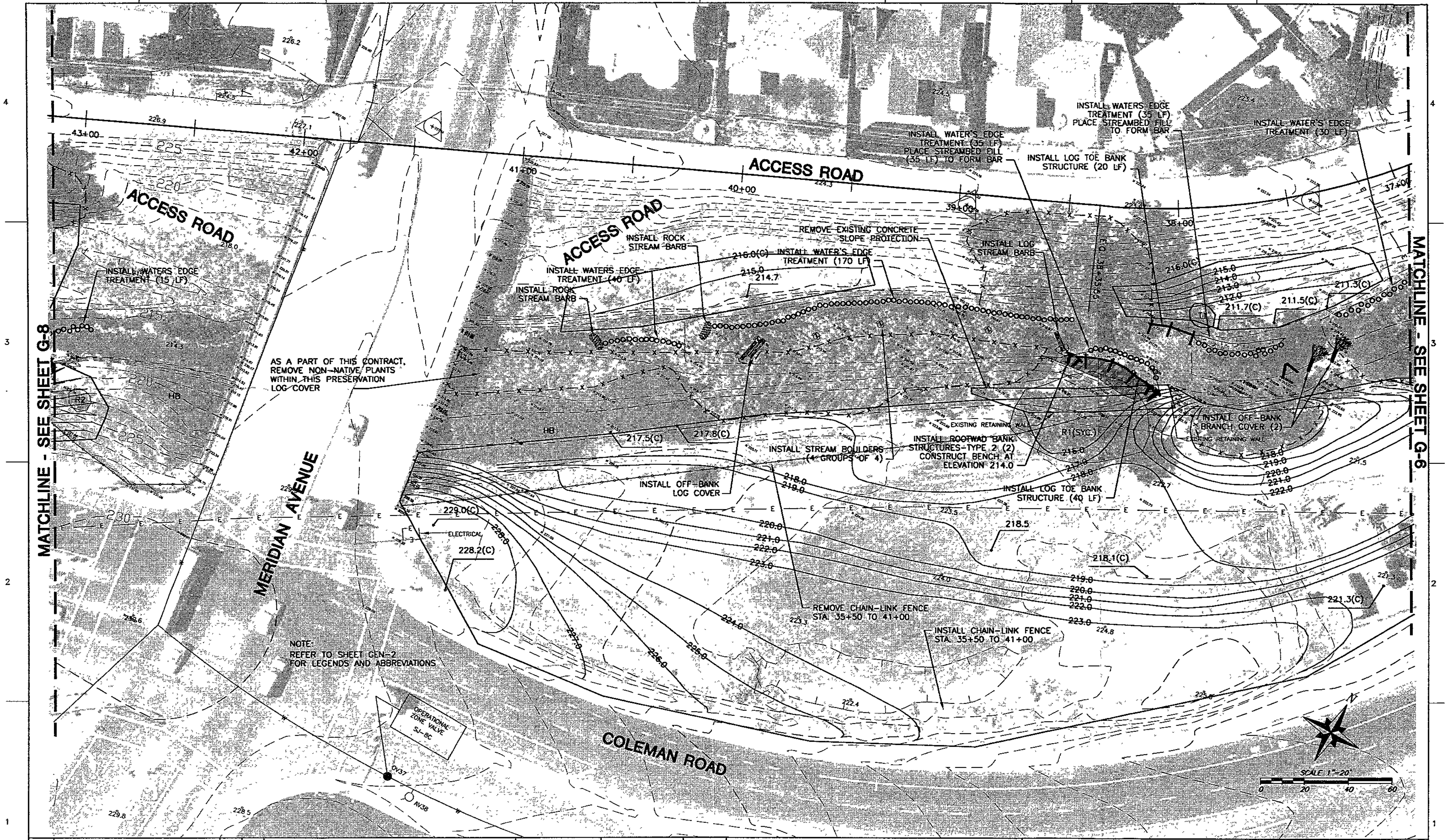
SCALE AS SHOWN

SHEET
G-6
9 OF 47


MATCHLINE - SEE SHEET G-8
MATCHLINE - SEE SHEET G-6
ACCESS ROAD
ACCESS ROAD
ACCESS ROAD
MERIDIAN AVENUE
COLEMAN ROAD
43+00
42+00
41+00
40+00
39+00
38+00
37+00
INSTALL WATERS EDGE TREATMENT (15 LF)
AS A PART OF THIS CONTRACT, REMOVE NON-NATIVE PLANTS WITHIN THIS PRESERVATION LOG COVER
INSTALL WATERS EDGE TREATMENT (40 LF)
INSTALL ROCK STREAM BARB
INSTALL ROCK STREAM BARB
216.0(C) INSTALL WATER'S EDGE TREATMENT (170 LF)
REMOVE EXISTING CONCRETE SLOPE PROTECTION
INSTALL WATER'S EDGE TREATMENT (35 LF) PLACE STREAMBED FILL (35 LF) TO FORM BAR
INSTALL LOG TOE BANK STRUCTURE (20 LF)
INSTALL WATERS EDGE TREATMENT (35 LF) PLACE STREAMBED FILL TO FORM BAR
INSTALL WATER'S EDGE TREATMENT (30 LF)
INSTALL LOG STREAM BARB
EQ 38+35.5
INSTALL OFF-BANK BRANCH COVER (2)
EXISTING RETAINING WALL
EXISTING RETAINING WALL
INSTALL ROOTWAD BANK STRUCTURES-TYPE 2 (2) CONSTRUCT BENCH AT ELEVATION 214.0
INSTALL STREAM BOULDERS (4 GROUPS OF 4)
INSTALL OFF-BANK LOG COVER
INSTALL LOG TOE BANK STRUCTURE (40 LF)
R1(SYC)
R2
HB
HB
217.5(C)
217.8(C)
229.0(C)
228.2(C)
ELECTRICAL
218.5
218.1(C)
221.3(C)
211.3(C)
211.5(C)
211.7(C)
REMOVE CHAIN-LINK FENCE STA. 35+50 TO 41+00
INSTALL CHAIN-LINK FENCE STA. 35+50 TO 41+00
NOTE: REFER TO SHEET GEN-2 FOR LEGENDS AND ABBREVIATIONS
OPERATIONAL ZONE VALVE SJ-8C
OV37
AV38
SCALE 1"=20'
0
20
40
60
N

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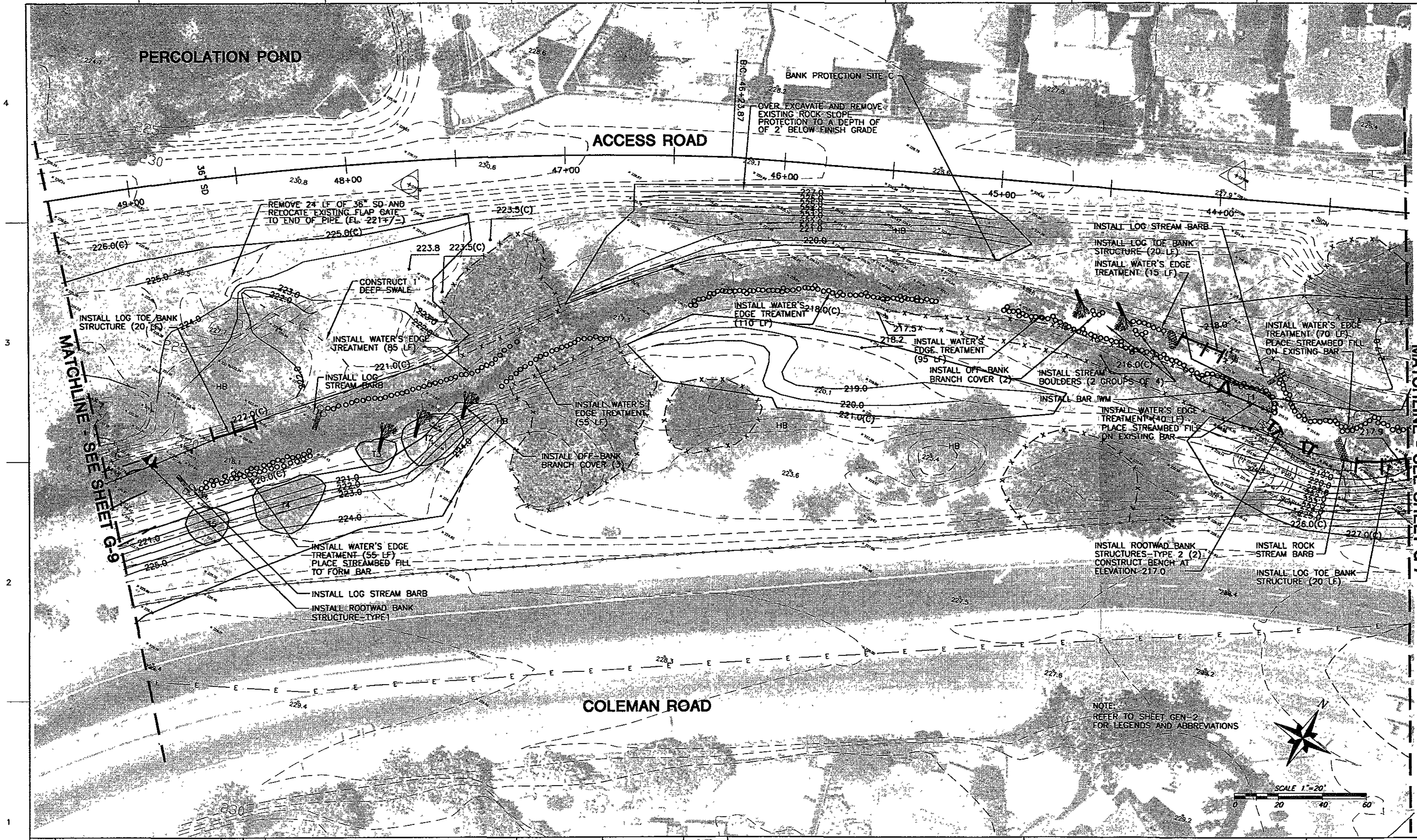
SHEET G-7

10 OF 47


PERCOLATION POND
ACCESS ROAD
COLEMAN ROAD
MATCHLINE - SEE SHEET G-9
MATCHLINE - SEE SHEET G-7
36" SD
49+00
48+00
47+00
46+00
45+00
44+00
B.C. 46+23.87
BANK PROTECTION SITE C
OVER EXCAVATE AND REMOVE EXISTING ROCK SLOPE PROTECTION TO A DEPTH OF OF 2' BELOW FINISH GRADE
REMOVE 24 LF OF 36" SD AND RELOCATE EXISTING FLAP GATE TO END OF PIPE (FL 221+/-)
223.5(C)
223.8
225.0(C)
226.0(C)
CONSTRUCT 1' DEEP SWALE
INSTALL LOG TOE BANK STRUCTURE (20 LF)
INSTALL WATER'S EDGE TREATMENT (85 LF)
221.0(C)
INSTALL LOG STREAM BARB
222.0(C)
HB
220.0(C)
T1
T2
T3
T4
T5
INSTALL WATER'S EDGE TREATMENT (55 LF) PLACE STREAMBED FILL TO FORM BAR
INSTALL LOG STREAM BARB
INSTALL ROOTWAD BANK STRUCTURE-TYPE1
INSTALL WATER'S EDGE TREATMENT (55 LF)
INSTALL OFF-BANK BRANCH COVER (3)
INSTALL WATER'S EDGE TREATMENT (110 LF)
218.0(C)
217.5
218.2
INSTALL WATER'S EDGE TREATMENT (95 LF)
INSTALL OFF-BANK BRANCH COVER (2)
219.0
220.0
221.0(C)
INSTALL STREAM BOULDERS (2 GROUPS OF 4)
INSTALL BAR IWM
INSTALL LOG STREAM BARB
INSTALL LOG TOE BANK STRUCTURE (20 LF)
INSTALL WATER'S EDGE TREATMENT (15 LF)
216.0(C)
INSTALL WATER'S EDGE TREATMENT (70 LF) PLACE STREAMBED FILL ON EXISTING BAR
INSTALL WATER'S EDGE TREATMENT (40 LF) PLACE STREAMBED FILL ON EXISTING BAR
217.9
226.0(C)
227.0(C)
INSTALL ROOTWAD BANK STRUCTURES-TYPE 2 (2) CONSTRUCT BENCH AT ELEVATION 217.0
INSTALL ROCK STREAM BARB
INSTALL LOG TOE BANK STRUCTURE (20 LF)
SIGN
E
N
SCALE 1"=20'
0
20
40
60

NOTE:
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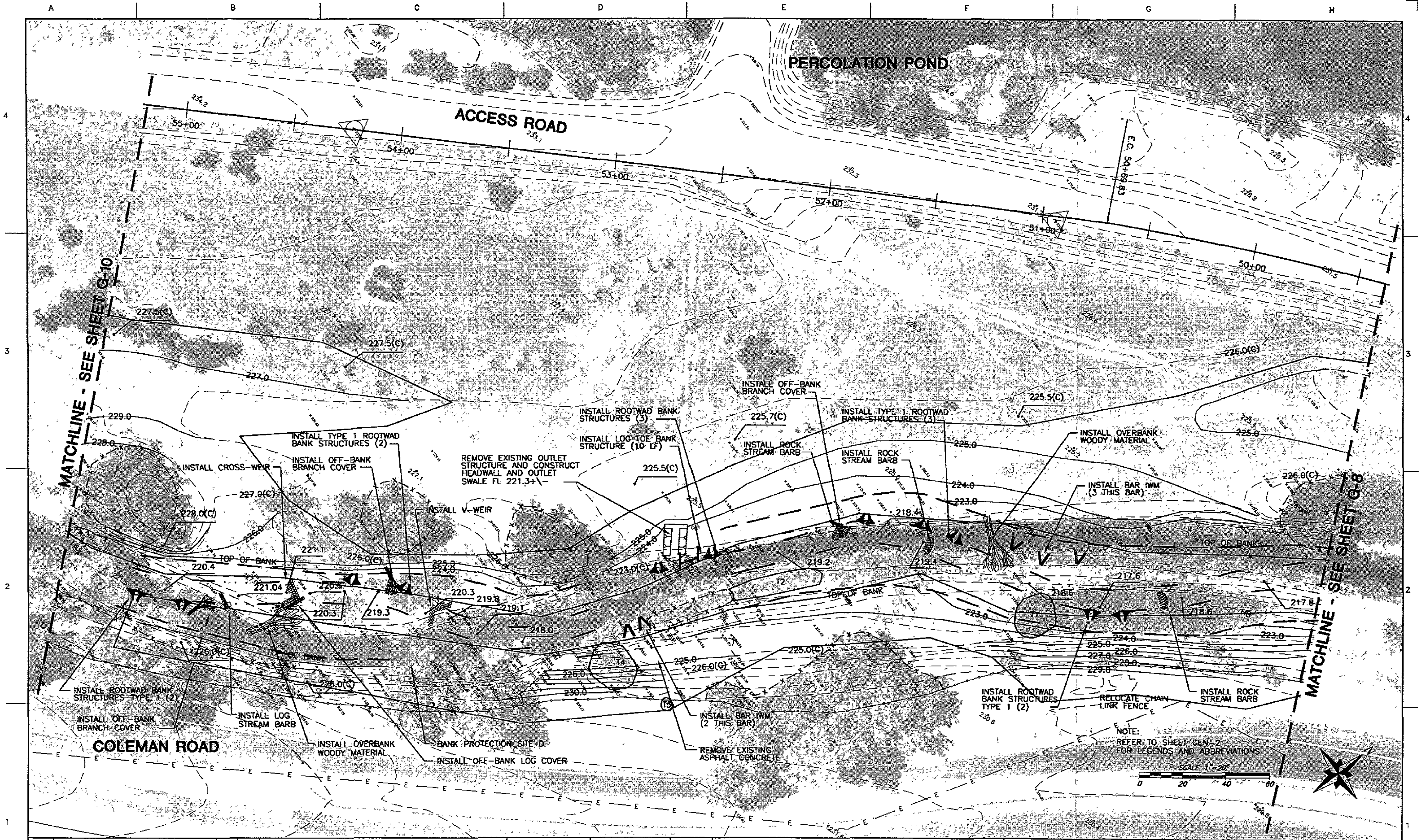
SCALE AS SHOWN
SHEET
G-8
11 OF 47


PERCOLATION POND
ACCESS ROAD
55+00
54+00
53+00
52+00
51+00
50+00
E.C. 50+69.83
MATCHLINE - SEE SHEET G-10
MATCHLINE - SEE SHEET G-8
227.5(C)
227.0
229.0
228.0
227.0(C)
228.0(C)
226.0
226.0(C)
225.7(C)
225.5(C)
225.0
224.0
223.0
223.0(C)
226.0(C)
225.0(C)
220.4
221.04
221.1
220.3
219.3
219.8
219.1
218.0
219.2
219.4
218.4
217.6
218.6
217.8
INSTALL CROSS-WEIR
INSTALL TYPE 1 ROOTWAD BANK STRUCTURES (2)
INSTALL OFF-BANK BRANCH COVER
INSTALL V-WEIR
REMOVE EXISTING OUTLET STRUCTURE AND CONSTRUCT HEADWALL AND OUTLET SWALE FL 221.3+\-
INSTALL ROOTWAD BANK STRUCTURES (3)
INSTALL LOG TOE BANK STRUCTURE (10 LF)
INSTALL OFF-BANK BRANCH COVER
INSTALL ROCK STREAM BARB
INSTALL ROCK STREAM BARB
INSTALL TYPE 1 ROOTWAD BANK STRUCTURES (3)
INSTALL OVERBANK WOODY MATERIAL
INSTALL BAR IWM (3 THIS BAR)
TOP OF BANK
TOP OF BANK
TOP OF BANK
TOP OF BANK
T1
T2
T3
T4
INSTALL ROOTWAD BANK STRUCTURES-TYPE 1 (2)
INSTALL OFF-BANK BRANCH COVER
INSTALL LOG STREAM BARB
INSTALL OVERBANK WOODY MATERIAL
BANK PROTECTION SITE D
INSTALL OFF-BANK LOG COVER
INSTALL BAR IWM (2 THIS BAR)
REMOVE EXISTING ASPHALT CONCRETE
INSTALL ROOTWAD BANK STRUCTURES TYPE 1 (2)
RELOCATE CHAIN LINK FENCE
INSTALL ROCK STREAM BARB
COLEMAN ROAD
SCALE 1"=20'
0
20
40
60

NOTE:
REFER TO SHEET GEN-2 FOR LEGENDS AND ABBREVIATIONS

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	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

Jones & Stokes
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Santa Clara Valley Water District

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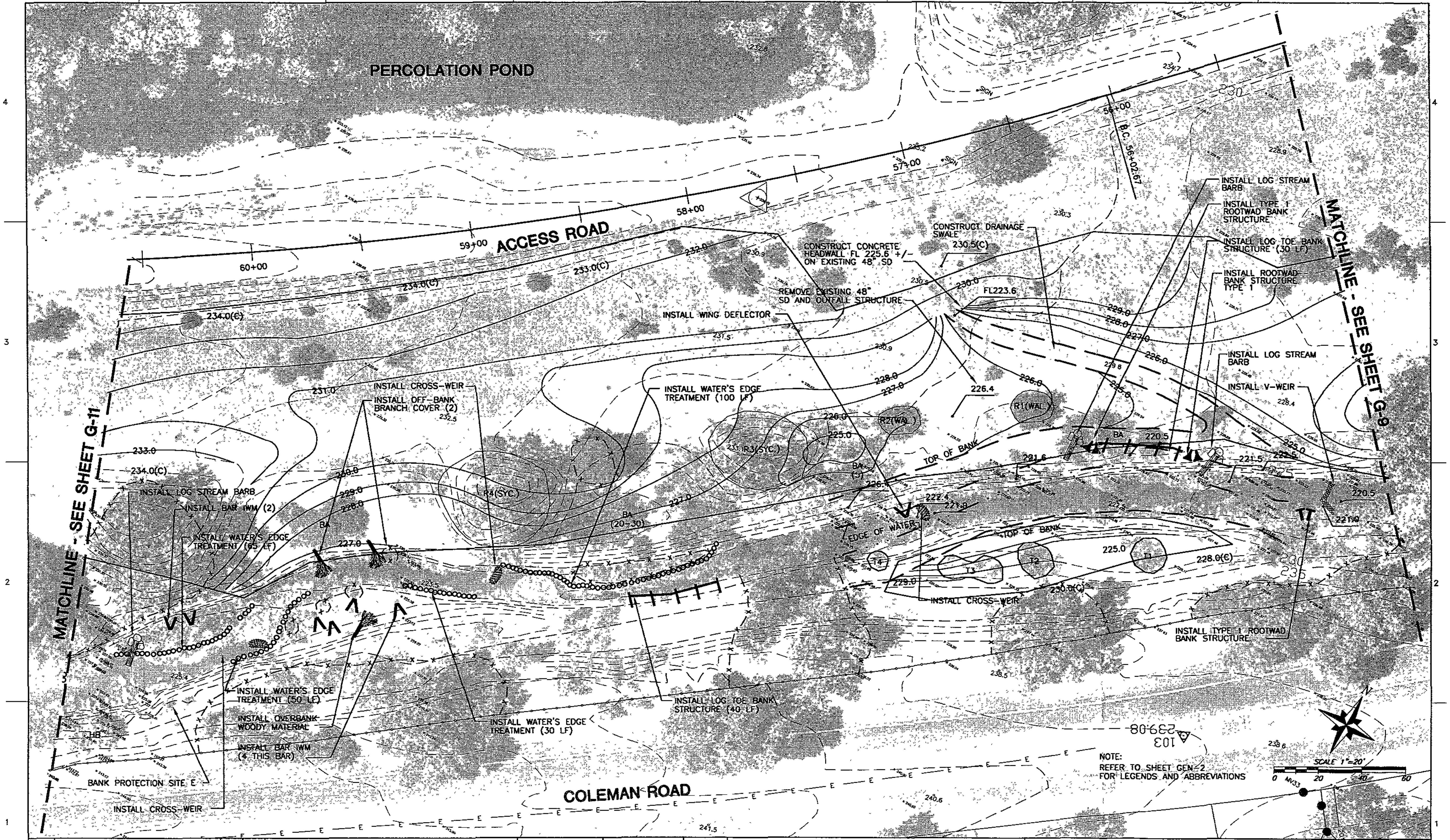
SCALE
AS SHOWN

SHEET
G-9
12 OF 47


PERCOLATION POND
ACCESS ROAD
COLEMAN ROAD
MATCHLINE - SEE SHEET G-11
MATCHLINE - SEE SHEET G-9
60+00
59+00
58+00
57+00
56+00
B.C. 56+02.67
SIGN
234.0(C)
233.0(C)
232.0
231.0
230.0
229.0
228.0
227.0
226.0
225.0
233.0
230.5(C)
FL223.6
226.4
220.5
221.6
221.5
222.4
221.8
221.9
228.0(C)
230.0(C)
229.0
225.0
CONSTRUCT DRAINAGE SWALE
CONSTRUCT CONCRETE HEADWALL FL 225.6 +/- ON EXISTING 48" SD
REMOVE EXISTING 48" SD AND OUTFALL STRUCTURE
INSTALL WING DEFLECTOR
INSTALL WATER'S EDGE TREATMENT (100 LF)
INSTALL CROSS-WEIR
INSTALL OFF-BANK BRANCH COVER (2)
INSTALL LOG STREAM BARB
INSTALL TYPE 1 ROOTWAD BANK STRUCTURE
INSTALL LOG TOE BANK STRUCTURE (30 LF)
INSTALL ROOTWAD BANK STRUCTURE TYPE 1
INSTALL LOG STREAM BARB
INSTALL V-WEIR
INSTALL LOG STREAM BARB
INSTALL BAR IWM (2)
INSTALL WATER'S EDGE TREATMENT (65 LF)
INSTALL WATER'S EDGE TREATMENT (50 LF)
INSTALL OVERBANK WOODY MATERIAL
INSTALL BAR IWM (4 THIS BAR)
BANK PROTECTION SITE E
INSTALL CROSS-WEIR
INSTALL WATER'S EDGE TREATMENT (30 LF)
INSTALL LOG TOE BANK STRUCTURE (40 LF)
INSTALL CROSS-WEIR
INSTALL TYPE 1 ROOTWAD BANK STRUCTURE
TOP OF BANK
EDGE OF WATER
TOP OF BANK
R1(WAL.)
R2(WAL.)
R3(SYC.)
R4(SYC.)
T1
T2
T3
T4
BA
BA (20-30)
HB
N
NOTE:
REFER TO SHEET GEN-2 FOR LEGENDS AND ABBREVIATIONS
SCALE 1"=20'
0
20
40
60

REV	DESCRIPTION	DATE	APPR
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Santa Clara Valley Water District
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DATE

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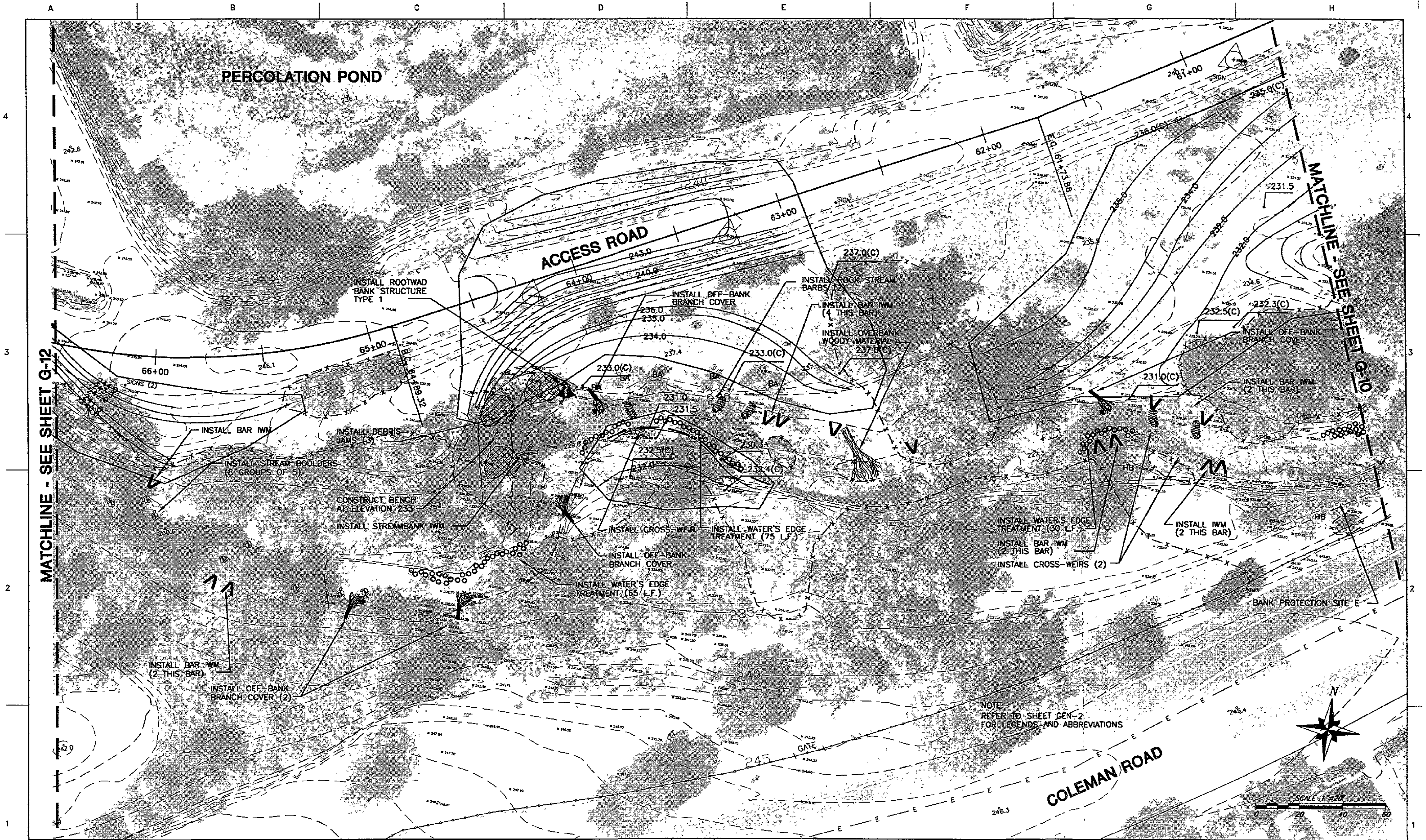
SHEET G-10

13 OF 47


PERCOLATION POND
ACCESS ROAD
COLEMAN ROAD
MATCHLINE - SEE SHEET G-12
MATCHLINE - SEE SHEET G-10
61+00
62+00
63+00
64+00
65+00
66+00
E.Q. 61+73.88
B.C. 64+89.32
INSTALL ROOTWAD BANK STRUCTURE TYPE 1
INSTALL OFF-BANK BRANCH COVER
INSTALL ROCK STREAM BARBS (2)
INSTALL BAR IWM (4 THIS BAR)
INSTALL OVERBANK WOODY MATERIAL
INSTALL OFF-BANK BRANCH COVER
INSTALL BAR IWM (2 THIS BAR)
INSTALL BAR IWM
INSTALL STREAM BOULDERS (8 GROUPS OF 5)
INSTALL DEBRIS JAMS (3)
CONSTRUCT BENCH AT ELEVATION 233
INSTALL STREAMBANK IWM
INSTALL CROSS-WEIR
INSTALL WATER'S EDGE TREATMENT (75 L.F.)
INSTALL OFF-BANK BRANCH COVER
INSTALL WATER'S EDGE TREATMENT (65 L.F.)
INSTALL WATER'S EDGE TREATMENT (30 L.F.)
INSTALL BAR IWM (2 THIS BAR)
INSTALL CROSS-WEIRS (2)
INSTALL IWM (2 THIS BAR)
BANK PROTECTION SITE E
INSTALL BAR IWM (2 THIS BAR)
INSTALL OFF-BANK BRANCH COVER (2)
SIGNS (2)
SIGN
GATE
BA
HB
237.0(C)
233.0(C)
232.5(C)
232.4(C)
232.3(C)
231.0(C)
235.6(C)
236.0(C)
243.0
240.0
236.0
235.0
234.0
233.0
232.0
231.5
231.0
230.3
240
235
245
NOTE:
REFER TO SHEET GEN-2
FOR LEGENDS AND ABBREVIATIONS
N
SCALE 1"=20'
0 20 40 60

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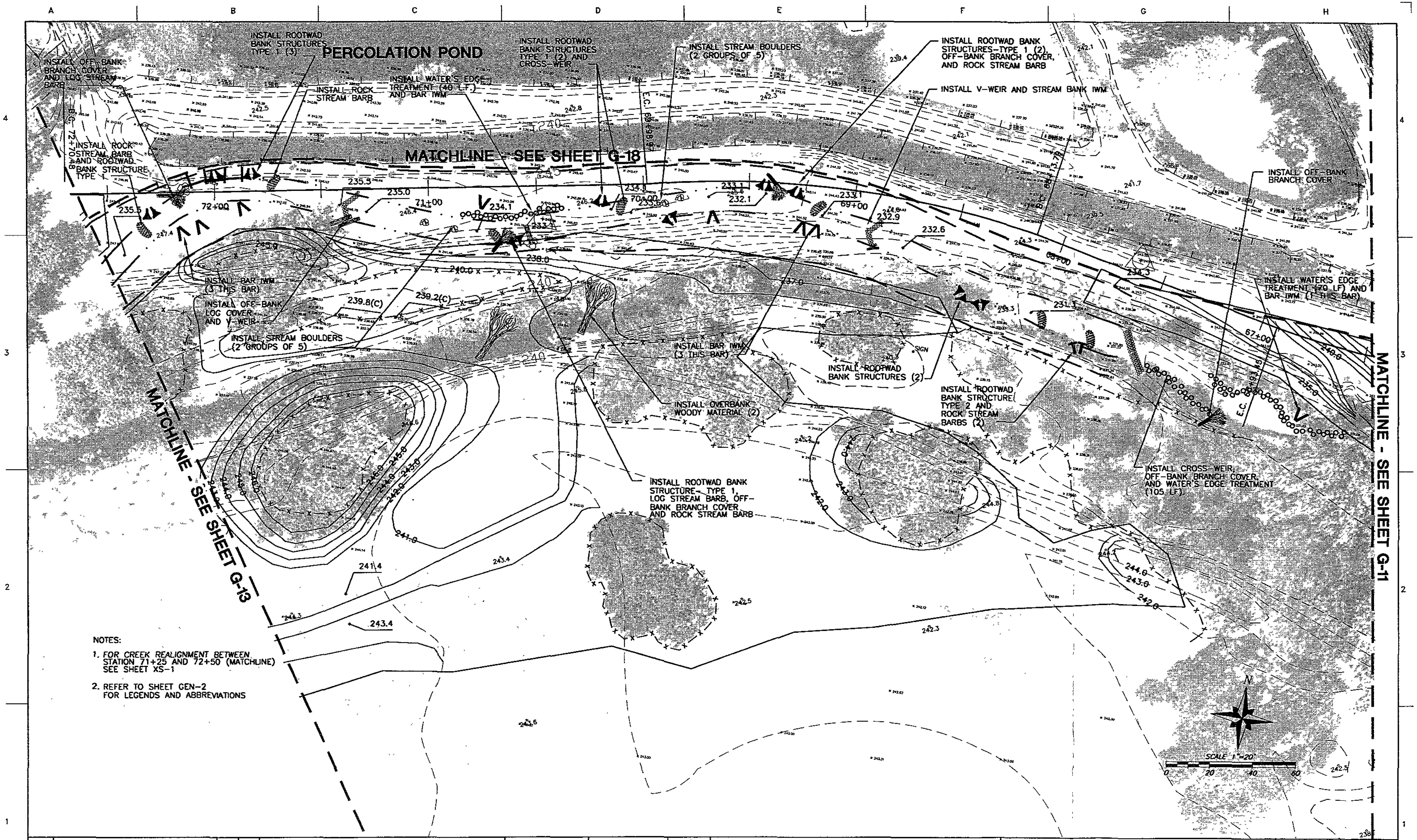
SHEET G-11


PERCOLATION POND
MATCHLINE - SEE SHEET G-18
MATCHLINE - SEE SHEET G-13
MATCHLINE - SEE SHEET G-11
INSTALL OFF-BANK BRANCH COVER AND LOG STREAM BARB
INSTALL ROOTWAD BANK STRUCTURES TYPE 1 (3)
INSTALL ROCK STREAM BARB
INSTALL WATER'S EDGE TREATMENT (40 L.F.) AND BAR IWM
INSTALL ROOTWAD BANK STRUCTURES TYPE 1 (2) AND CROSS-WEIR
INSTALL STREAM BOULDERS (2 GROUPS OF 5)
INSTALL ROOTWAD BANK STRUCTURES-TYPE 1 (2), OFF-BANK BRANCH COVER, AND ROCK STREAM BARB
INSTALL V-WEIR AND STREAM BANK IWM
INSTALL ROCK STREAM BARB AND ROOTWAD BANK STRUCTURE TYPE 1
INSTALL BAR IWM (3 THIS BAR)
INSTALL OFF-BANK LOG COVER AND V-WEIR
INSTALL STREAM BOULDERS (2 GROUPS OF 5)
INSTALL BAR IWM (3 THIS BAR)
INSTALL ROOTWAD BANK STRUCTURES (2)
INSTALL OVERBANK WOODY MATERIAL (2)
INSTALL ROOTWAD BANK STRUCTURE TYPE 2 AND ROCK STREAM BARBS (2)
INSTALL OFF-BANK BRANCH COVER
INSTALL WATER'S EDGE TREATMENT (70 LF) AND BAR IWM (1 THIS BAR)
INSTALL CROSS-WEIR, OFF-BANK BRANCH COVER AND WATER'S EDGE TREATMENT (105 LF)
INSTALL ROOTWAD BANK STRUCTURE- TYPE 1, LOG STREAM BARB, OFF-BANK BRANCH COVER AND ROCK STREAM BARB
SIGN
72+00
71+00
70+00
69+00
68+00
67+00
E.C. 72+70.48
E.C. 69+98.9
E.C.
235.5
235.5
235.0
234.1
234.8
233.6
233.1
233.1
232.1
232.9
232.6
231.3
234.3
233.3
238.0
237.0
240.0
239.8(C)
239.2(C)
245.9
241.0
241.4
243.4
243.4
244.3
242.5
242.3
242.8
242.1
241.7
239.5
239.4
240.5
246.4
246.2
247.4
244.3
244.0
243.0
242.0
242.5
235.0
240.0
238
N
SCALE 1"=20'
0
20
40
60
A
B
C
D
E
F
G
H
1
2
3
4

NOTES:

1. FOR CREEK REALIGNMENT BETWEEN STATION 71+25 AND 72+50 (MATCHLINE) SEE SHEET XS-1
2. REFER TO SHEET GEN-2 FOR LEGENDS AND ABBREVIATIONS

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

Jones & Stokes
2880 Zanker Rd., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard suite 100c
west sacramento, california 95691-3430

CONSULTANT STAMP

CONSULTANT STAMP

DATE	07/17/00
DESIGN	JH/KC
DRAWN	BH/BK/JS
CHECKED	EW/JZ

Santa Clara Valley Water District

ACCEPTED BY DISTRICT

DATE

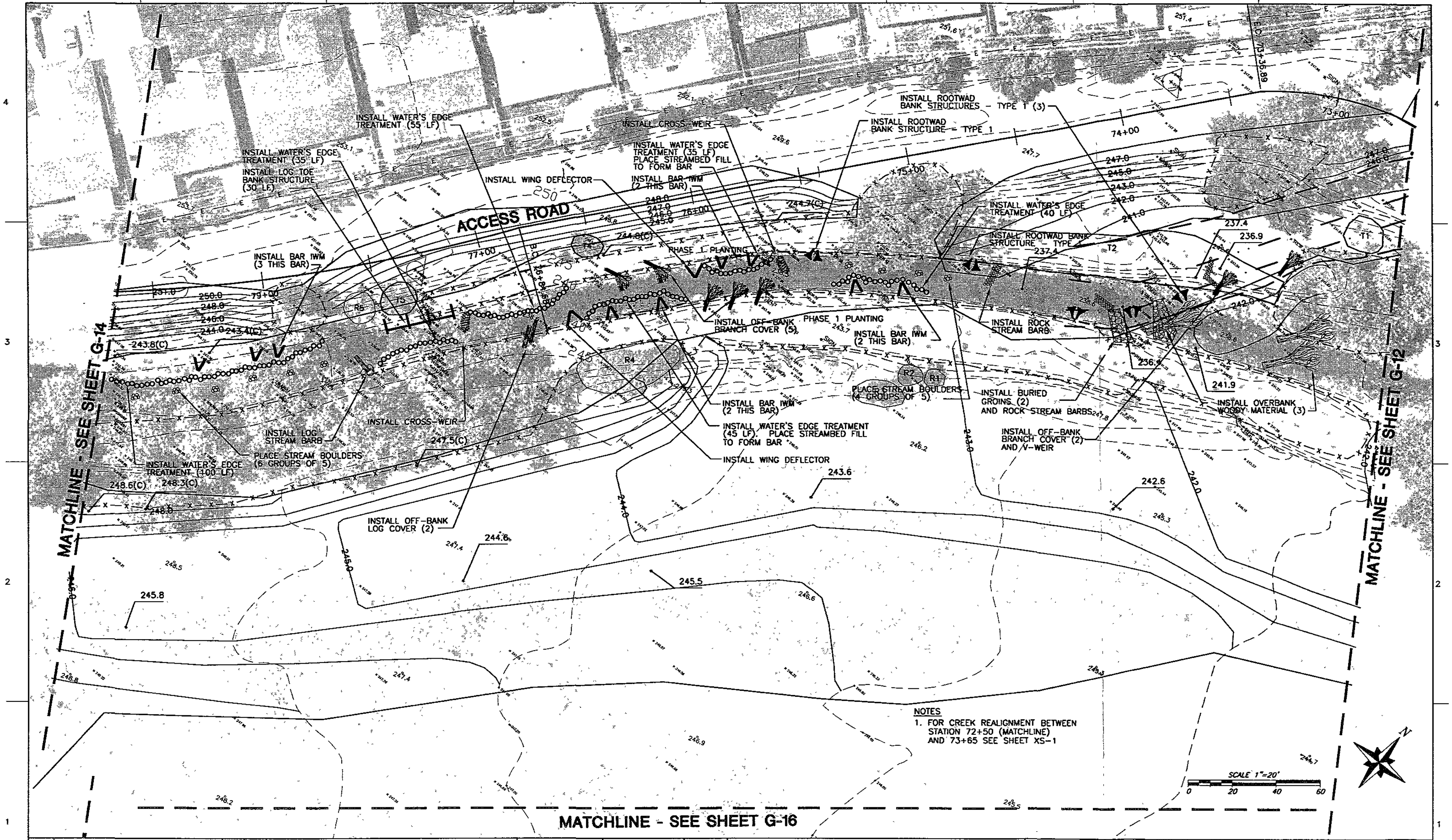
GUADALUPE CREEK RESTORATION PROJECT

GRADING PLAN

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE
AS SHOWN

SHEET
G-12
15 OF 47


ACCESS ROAD
INSTALL WATER'S EDGE TREATMENT (55 LF)
INSTALL WATER'S EDGE TREATMENT (35 LF)
INSTALL LOG TOE BANK STRUCTURE (30 LF)
INSTALL WING DEFLECTOR
INSTALL CROSS-WEIR
INSTALL WATER'S EDGE TREATMENT (35 LF) PLACE STREAMBED FILL TO FORM BAR
INSTALL BAR IWM (2 THIS BAR)
INSTALL ROOTWAD BANK STRUCTURE - TYPE 1
INSTALL ROOTWAD BANK STRUCTURES - TYPE 1 (3)
INSTALL WATER'S EDGE TREATMENT (40 LF)
INSTALL ROOTWAD BANK STRUCTURE - TYPE 1
INSTALL BAR IWM (3 THIS BAR)
PHASE 1 PLANTING
INSTALL OFF-BANK BRANCH COVER (5)
PHASE 1 PLANTING
INSTALL BAR IWM (2 THIS BAR)
INSTALL ROCK STREAM BARB
PLACE STREAM BOULDERS (4 GROUPS OF 5)
INSTALL BURIED GROINS (2) AND ROCK STREAM BARBS
INSTALL OVERBANK WOODY MATERIAL (3)
INSTALL BAR IWM (2 THIS BAR)
INSTALL WATER'S EDGE TREATMENT (45 LF). PLACE STREAMBED FILL TO FORM BAR
INSTALL WING DEFLECTOR
INSTALL OFF-BANK BRANCH COVER (2) AND V-WEIR
INSTALL CROSS-WEIR
INSTALL LOG STREAM BARB
PLACE STREAM BOULDERS (6 GROUPS OF 5)
INSTALL WATER'S EDGE TREATMENT (100 LF)
INSTALL OFF-BANK LOG COVER (2)
74+00
75+00
76+00
77+00
79+00
73+00
EC 73+36.89
SIGN
T1
T2
T4
T5
R1
R2
R4
R5
250
245
240
251.0
250.0
248.0
246.0
244.0
243.4(C)
243.8(C)
248.0
247.0
246.0
245.0
244.8(C)
244.7(C)
247.0
245.0
243.0
242.0
241.0
237.4
236.9
237.4
236.9
241.9
242.0
238.6
247.5(C)
248.6(C)
248.3(C)
248.8
253.1
252.5
252.1
251.6
251.4
249.6
247.7
248.8
243.7
243.6
246.2
247.8
242.6
243.3
244.6
247.4
245.5
246.6
245.8
245.5
248.8
247.4
246.3
246.9
248.2
245.5
246.7
243.0
242.0
244.0
245.0
MATCHLINE - SEE SHEET G-14
MATCHLINE - SEE SHEET G-12
MATCHLINE - SEE SHEET G-16
SCALE 1"=20'
0
20
40
60
N
A
B
C
D
E
F
G
H
1
2
3
4

NOTES

1. FOR CREEK REALIGNMENT BETWEEN STATION 72+50 (MATCHLINE) AND 73+65 SEE SHEET XS-1

REV	DESCRIPTION	DATE	APPR
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Santa Clara Valley Water District
ACCEPTED BY DISTRICT
DATE

GUADALUPE CREEK
RESTORATION PROJECT
GRADING PLAN

VERIFY SCALES
0 1"
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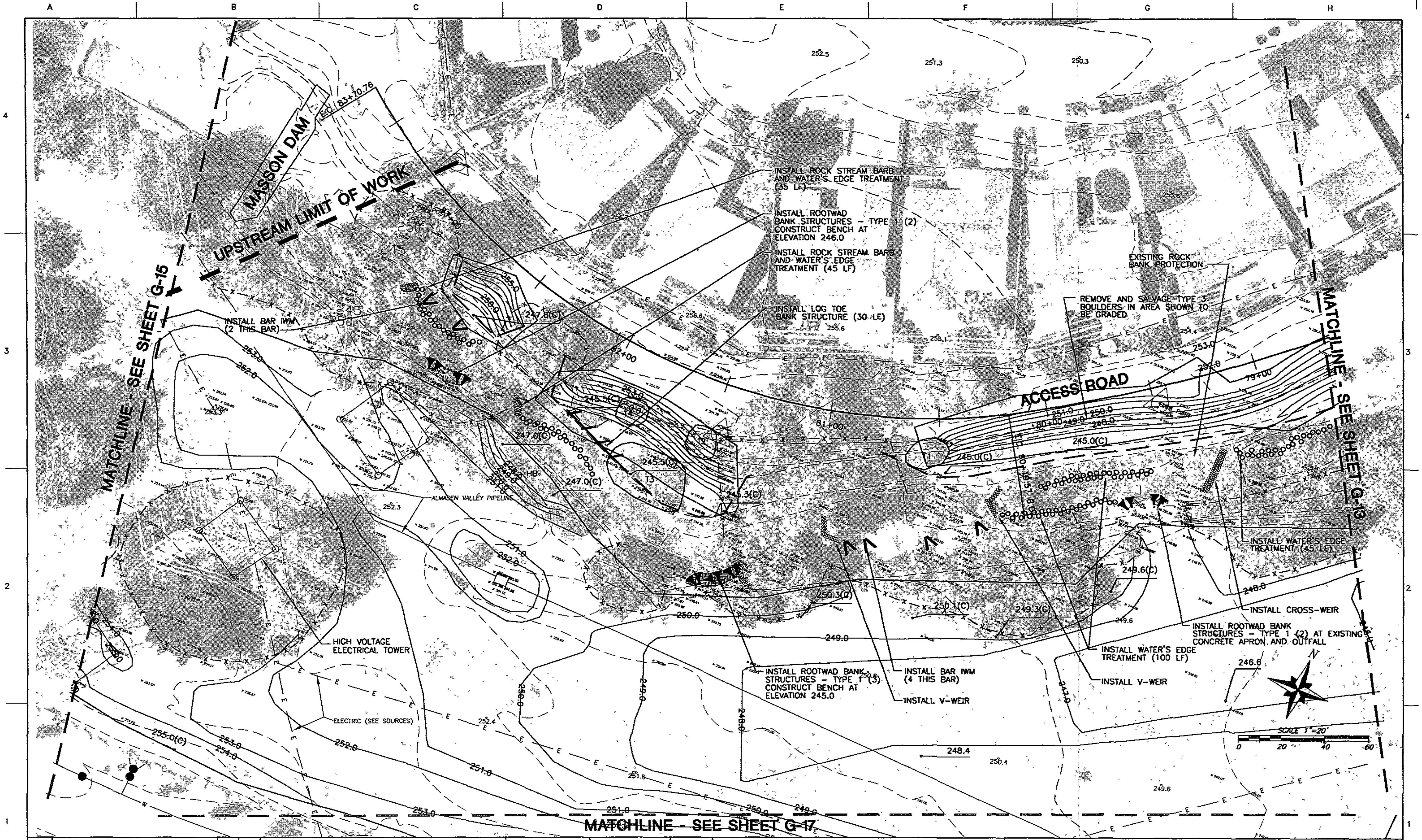
SCALE
AS SHOWN
SHEET
G-13
16 OF 47


MASSON DAM
E.O. 83+70.76
UPSTREAM LIMIT OF WORK
MATCHLINE - SEE SHEET G-15
MATCHLINE - SEE SHEET G-13
MATCHLINE - SEE SHEET G-17
ACCESS ROAD
INSTALL ROCK STREAM BARB AND WATER'S EDGE TREATMENT (35 LF)
INSTALL ROOTWAD BANK STRUCTURES - TYPE 1 (2) CONSTRUCT BENCH AT ELEVATION 246.0
INSTALL ROCK STREAM BARB AND WATER'S EDGE TREATMENT (45 LF)
INSTALL LOG TOE BANK STRUCTURE (30 LF)
INSTALL BAR IWM (2 THIS BAR)
EXISTING ROCK BANK PROTECTION
REMOVE AND SALVAGE TYPE 3 BOULDERS IN AREA SHOWN TO BE GRADED
INSTALL WATER'S EDGE TREATMENT (45 LF)
INSTALL CROSS-WEIR
INSTALL ROOTWAD BANK STRUCTURES - TYPE 1 (2) AT EXISTING CONCRETE APRON AND OUTFALL
INSTALL WATER'S EDGE TREATMENT (100 LF)
INSTALL V-WEIR
INSTALL BAR IWM (4 THIS BAR)
INSTALL V-WEIR
INSTALL ROOTWAD BANK STRUCTURES - TYPE 1 (3) CONSTRUCT BENCH AT ELEVATION 245.0
HIGH VOLTAGE ELECTRICAL TOWER
ALMADEN VALLEY PIPELINE
ELECTRIC (SEE SOURCES)
HB
T3
82+00
81+00
80+00
79+00
247.8(C)
247.0(C)
245.5(C)
245.3(C)
245.0(C)
250.3(C)
250.1(C)
249.3(C)
249.6(C)
255.0(C)
252.5
251.3
250.3
255.6
255.1
252.3
252.4
248.4
250.4
249.6
246.6
253.0
252.0
251.0
250.0
249.0
248.0
247.0
N
SCALE 1"=20'
0
20
40
60

REV	DESCRIPTION	DATE	APPR
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nhc
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3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430

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DATE	07/17/00
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Santa Clara Valley Water District

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DATE

GUADALUPE CREEK RESTORATION PROJECT

GRADING PLAN

VERIFY SCALES
0 1"
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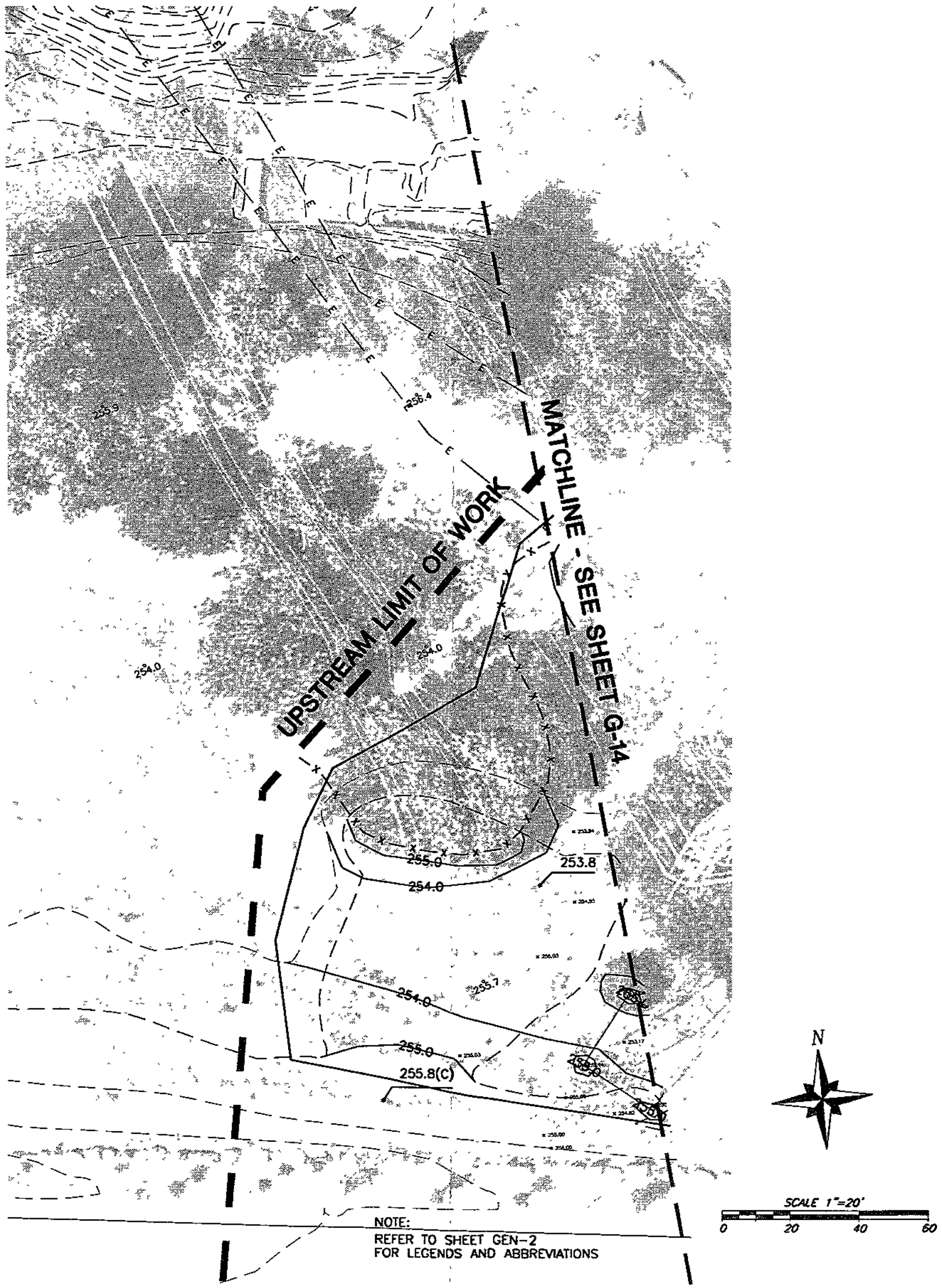
SCALE
AS SHOWN

SHEET
G-14
17 OF 47



NOTE:
REFER TO SHEET GEN-2
FOR LEGENDS AND ABBREVIATIONS

REV	DESCRIPTION	DATE	APPR
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Santa Clara Valley Water District

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DATE

GUADALUPE CREEK RESTORATION PROJECT

GRADING PLAN

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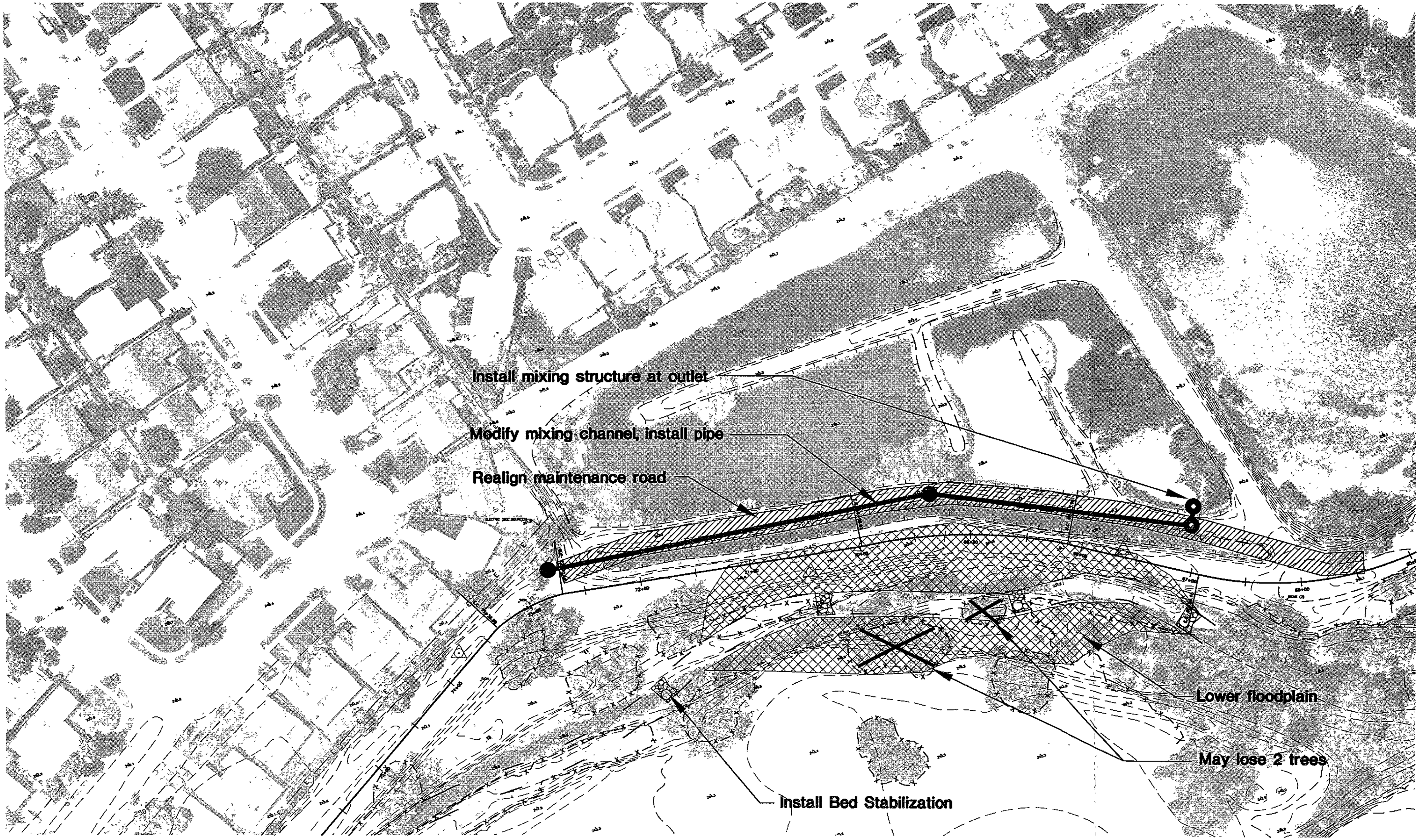
SCALE
AS SHOWN

SHEET
G-15
18 OF 47


Install mixing structure at outlet
Modify mixing channel, install pipe
Realign maintenance road
Lower floodplain
May lose 2 trees
Install Bed Stabilization

REV	DESCRIPTION	DATE	APPR
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DATE 09/13/00
DESIGN ar/ew
DRAWN of
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Santa Clara Valley Water District
ACCEPTED BY DISTRICT
DATE

Refined Channel Alignment at Pond 1

Conceptual Plan

VERIFY SCALES
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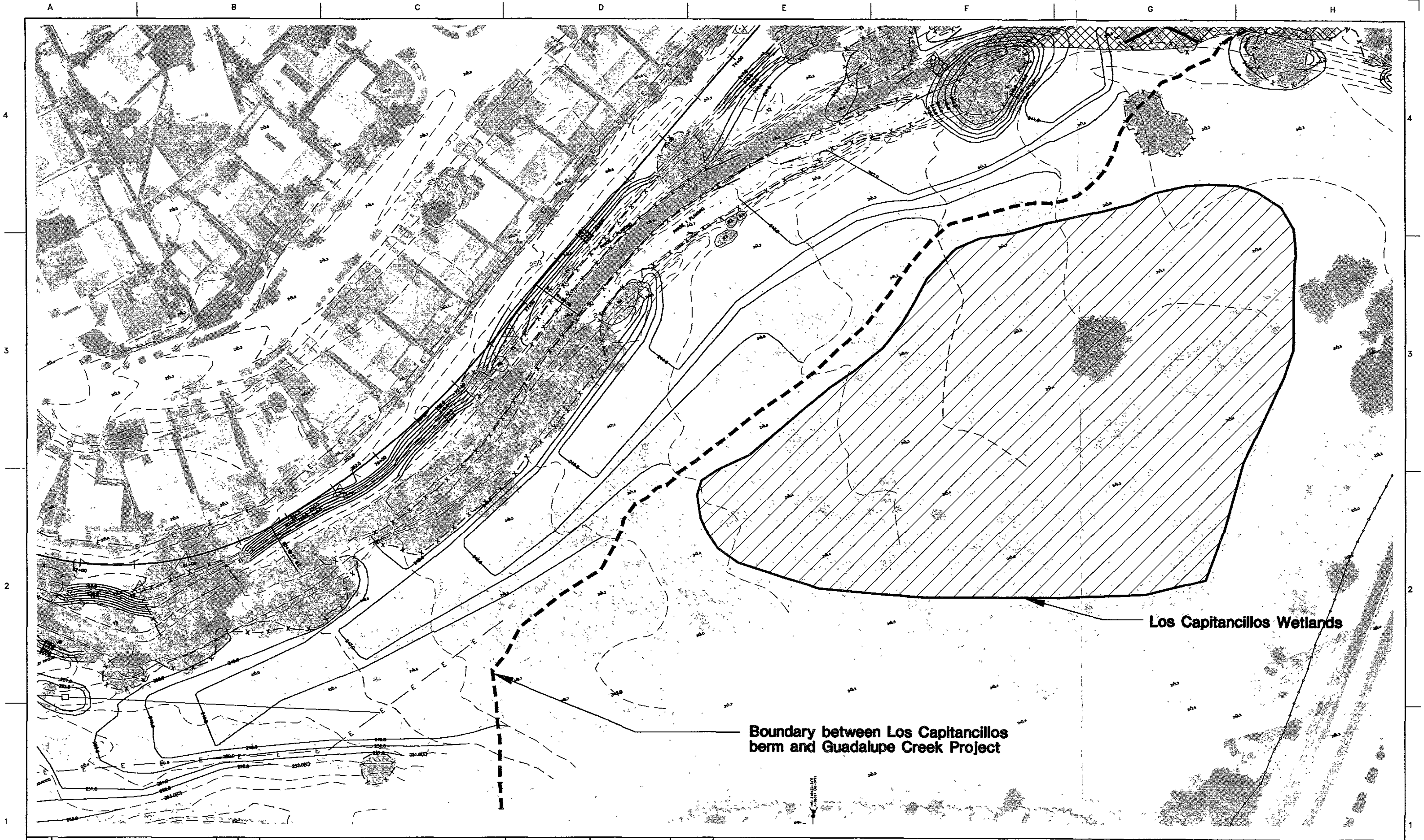
SCALE 1"=80'

SHEET G–16

2 OF 47


A
B
C
D
E
F
G
H
4
3
2
1
250
Los Capitancillos Wetlands
Boundary between Los Capitancillos berm and Guadalupe Creek Project

REV	DESCRIPTION	DATE	APPR
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DATE 09/13/00
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DATE

Refined Grading Plan for Los Capitancillos

Conceptual Grading Plan

VERIFY SCALES
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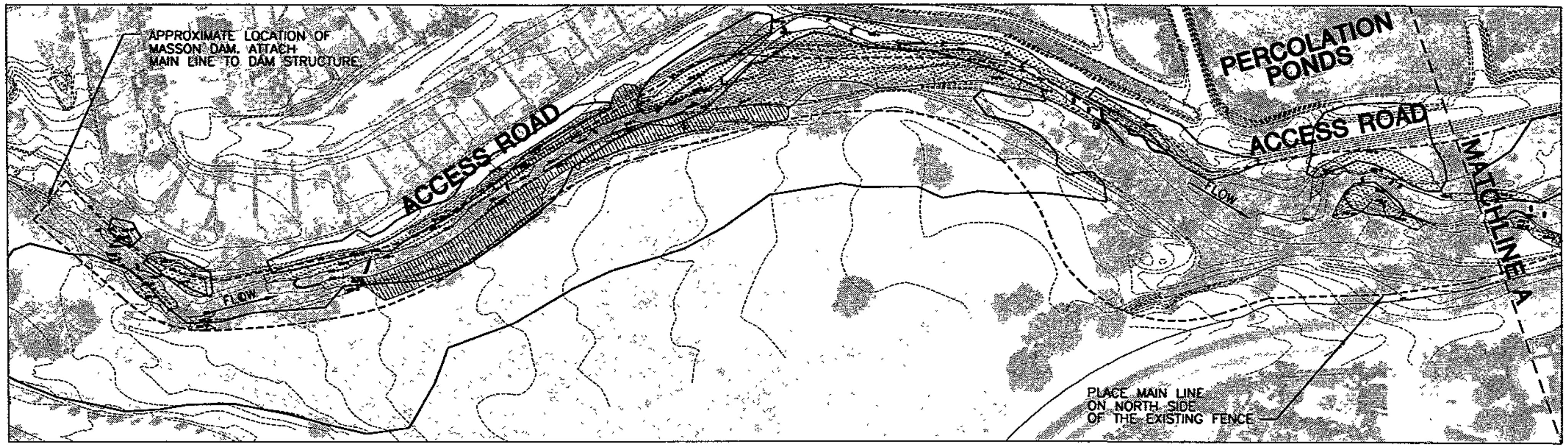
SCALE 1"=80'
SHEET
G-17
2 OF 47

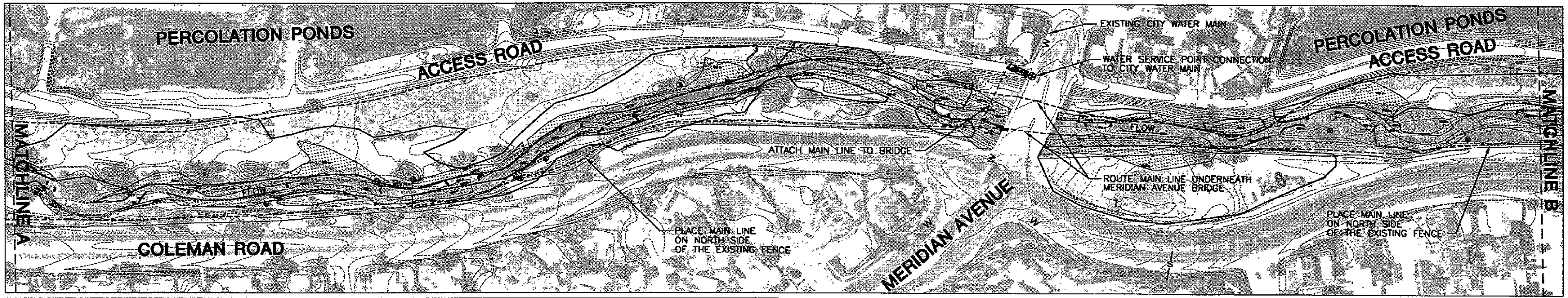

APPROXIMATE LOCATION OF MASSON DAM. ATTACH MAIN LINE TO DAM STRUCTURE.
ACCESS ROAD
FLOW
PERCOLATION PONDS
ACCESS ROAD
FLOW
MATCHLINE A
PLACE MAIN LINE ON NORTH SIDE OF THE EXISTING FENCE

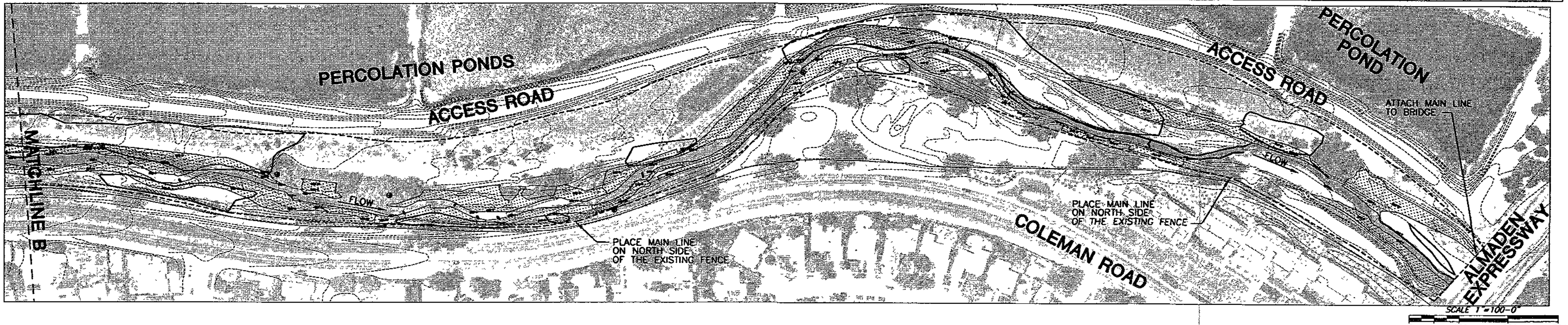
IRRIGATION LEGEND

SYMBOL	DESCRIPTION
⊕	WATER SERVICE POINT
⋈	SHUT OFF VALVE
◪	BACK FLOW ASSEMBLY
M	METER
- - - -	MAIN LINE
▨	EXISTING REVEGETATION PLANTINGS TO BE IRRIGATED
░	CONTAINER PLANTS AND TRANSPLANTS TO BE IRRIGATED

NOTES:

1. IRRIGATION EQUIPMENT IS SHOWN PARTIALLY DIAGRAMMATIC FOR GRAPHIC CLARITY.
2. PLANTING AREAS SHOWN ARE APPROXIMATE. VERIFY PLANT AREAS WITH THE PLANTING PLANS AND VERIFY EXACT LOCATIONS IN THE FIELD.
3. PLACE MAIN LINE AT THE TOP OF BANK WHENEVER POSSIBLE.


PERCOLATION PONDS
ACCESS ROAD
EXISTING CITY WATER MAIN
WATER SERVICE POINT CONNECTION TO CITY WATER MAIN
PERCOLATION PONDS
ACCESS ROAD
MATCHLINE A
FLOW
ATTACH MAIN LINE TO BRIDGE
FLOW
ROUTE MAIN LINE UNDERNEATH MERIDIAN AVENUE BRIDGE
MATCHLINE B
PLACE MAIN LINE ON NORTH SIDE OF THE EXISTING FENCE
MERIDIAN AVENUE
PLACE MAIN LINE ON NORTH SIDE OF THE EXISTING FENCE
COLEMAN ROAD



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DATE	07/17/00
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Santa Clara Valley Water District

ACCEPTED BY DISTRICT

DATE

GUADALUPE CREEK RESTORATION PROJECT

SCHEMATIC IRRIGATION PLAN

VERIFY SCALES
0 1"
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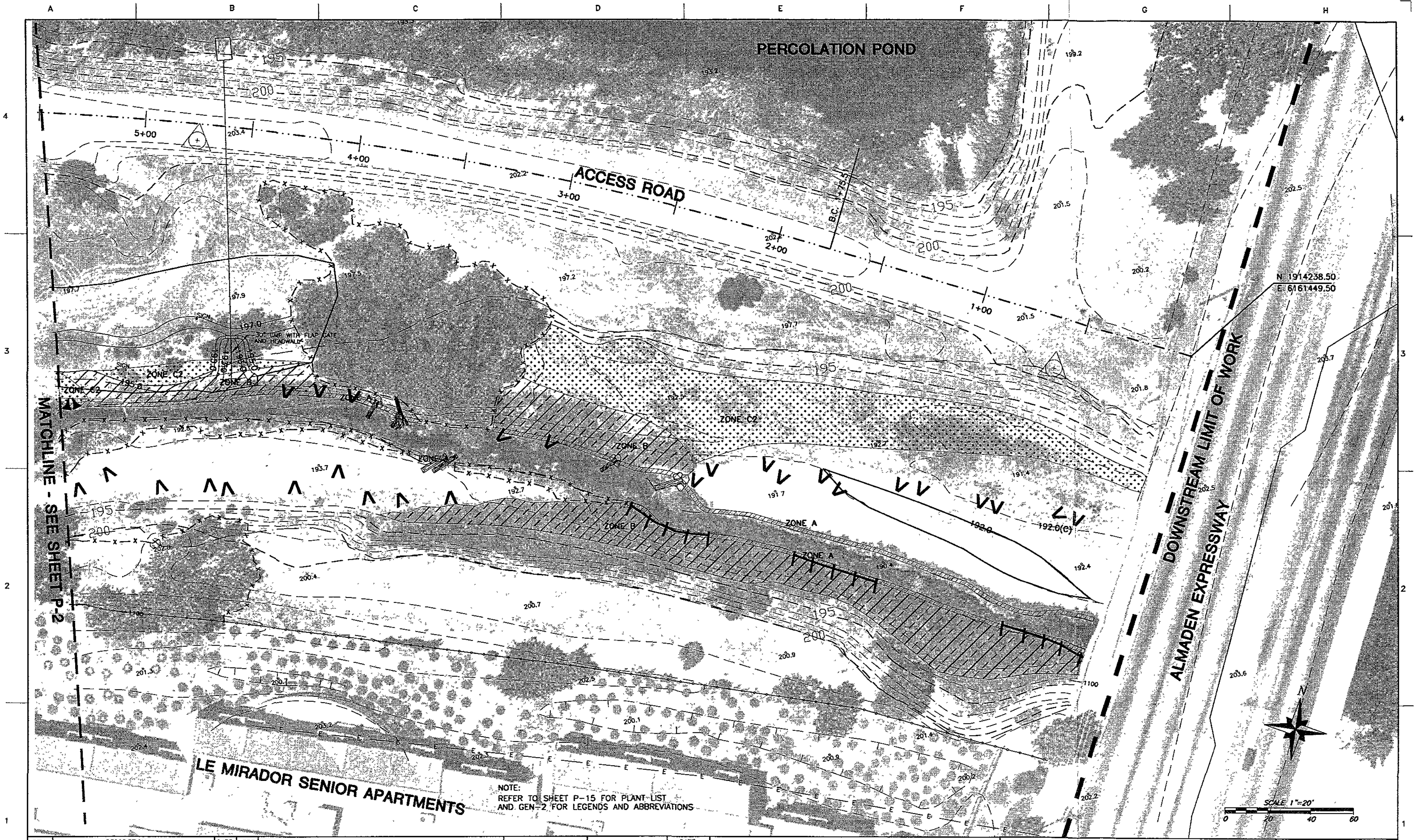
SCALE
AS SHOWN

SHEET
I-1
22 OF 47



NOTE:
REFER TO SHEET P-15 FOR PLANT LIST
AND GEN-2 FOR LEGENDS AND ABBREVIATIONS

REV	DESCRIPTION	DATE	APPR
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DATE 07/17/00
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DRAWN BH/CJ/BK
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Santa Clara Valley Water District

ACCEPTED BY DISTRICT

DATE

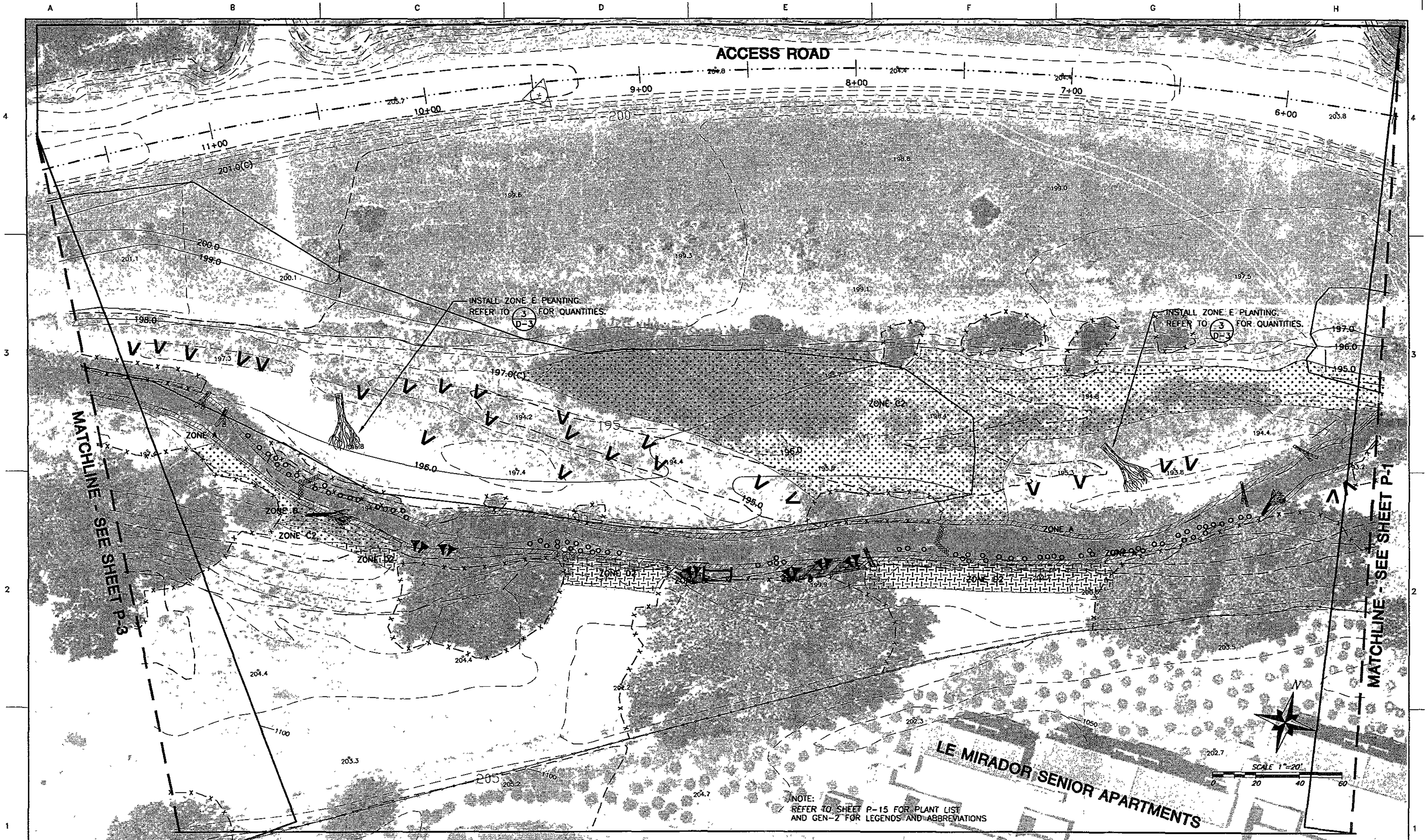
GUADALUPE CREEK RESTORATION PROJECT

PLANTING PLAN

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE AS SHOWN

SHEET
P-1
23 OF 47


ACCESS ROAD
11+00
10+00
9+00
8+00
7+00
6+00
200
201.0(C)
200.0
199.0
198.0
197.0(C)
196.0
195.0
195
197.0
196.0
195.0
INSTALL ZONE E PLANTING. REFER TO 3/D-3 FOR QUANTITIES.
INSTALL ZONE E PLANTING. REFER TO 3/D-3 FOR QUANTITIES.
ZONE A
ZONE B
ZONE C2
ZONE D2
ZONE E
MATCHLINE - SEE SHEET P-3
MATCHLINE - SEE SHEET P-1
LE MIRADOR SENIOR APARTMENTS
N
SCALE 1"=20'
0
20
40
60
1100
1050
205

NOTE:
REFER TO SHEET P-15 FOR PLANT LIST
AND GEN-2 FOR LEGENDS AND ABBREVIATIONS

REV	DESCRIPTION	DATE	APPR
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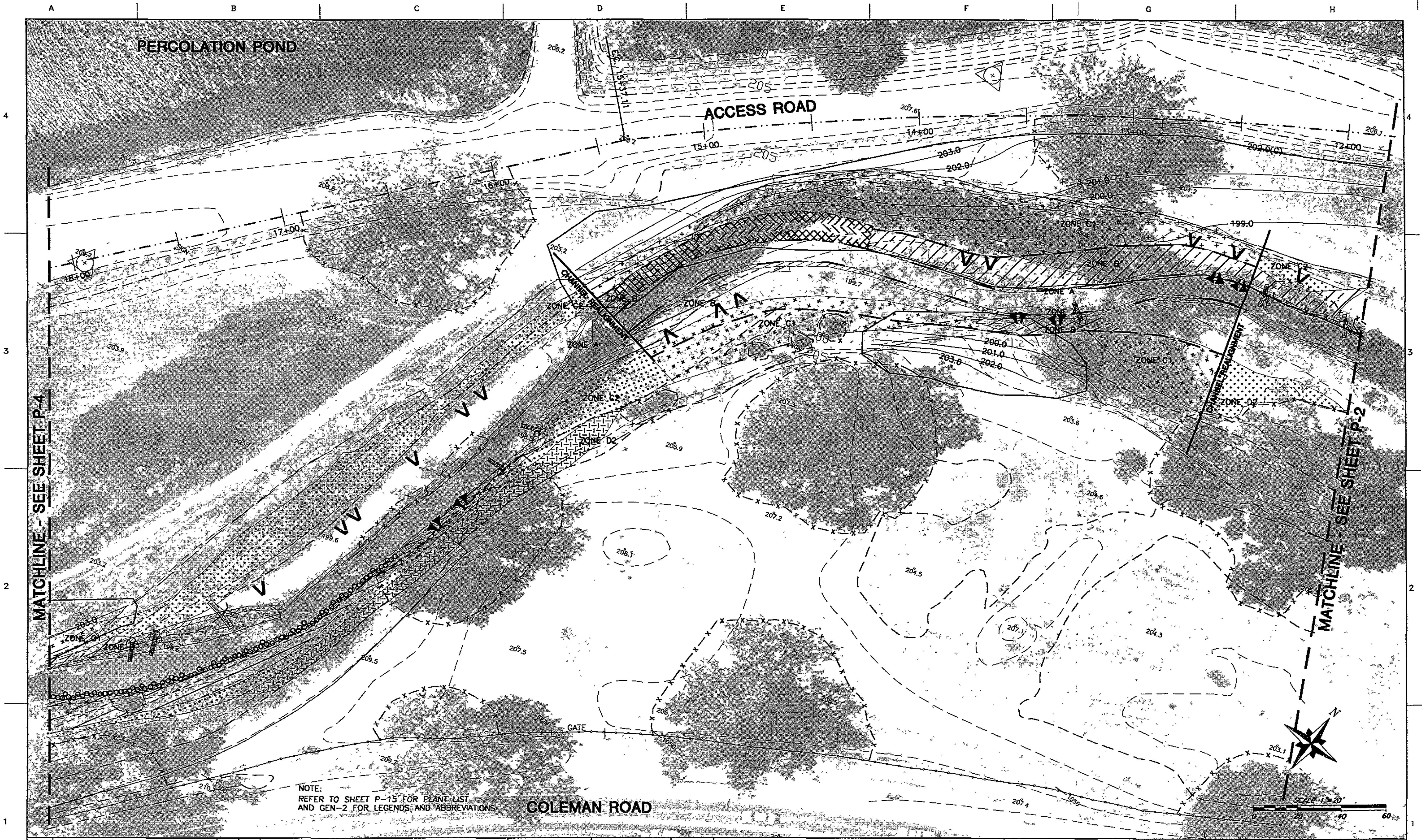
Santa Clara Valley Water District
ACCEPTED BY DISTRICT
DATE

GUADALUPE CREEK RESTORATION PROJECT

PLANTING PLAN

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE AS SHOWN
SHEET
P-2
24 OF 47



NOTE:
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AND GEN-2 FOR LEGENDS AND ABBREVIATIONS

REV	DESCRIPTION	DATE	APPR
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Santa Clara Valley Water District

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DATE

GUADALUPE CREEK RESTORATION PROJECT

PLANTING PLAN

VERIFY SCALES
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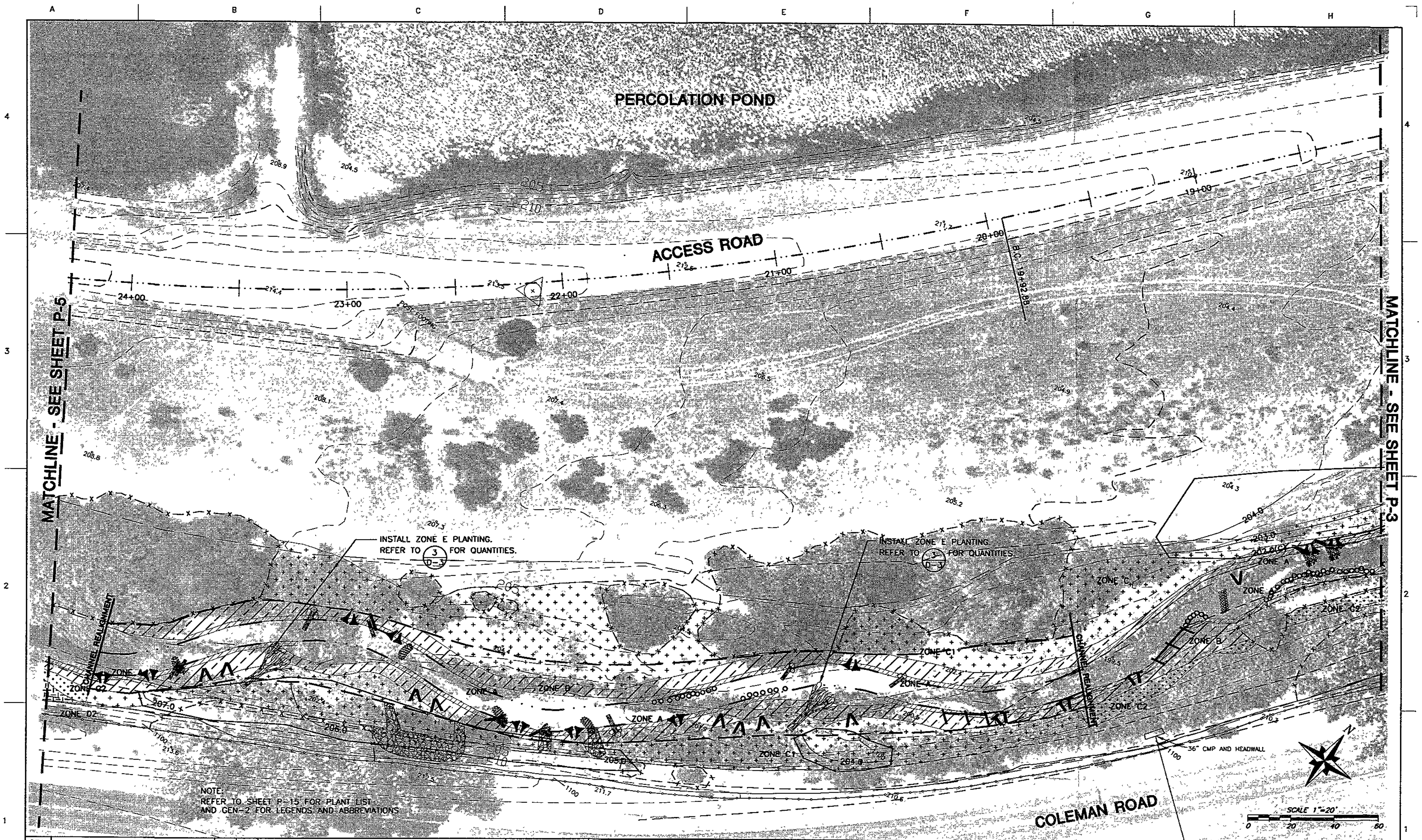
SCALE
AS SHOWN

SHEET
P-3
25 OF 47



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GUADALUPE CREEK RESTORATION PROJECT

PLANTING PLAN

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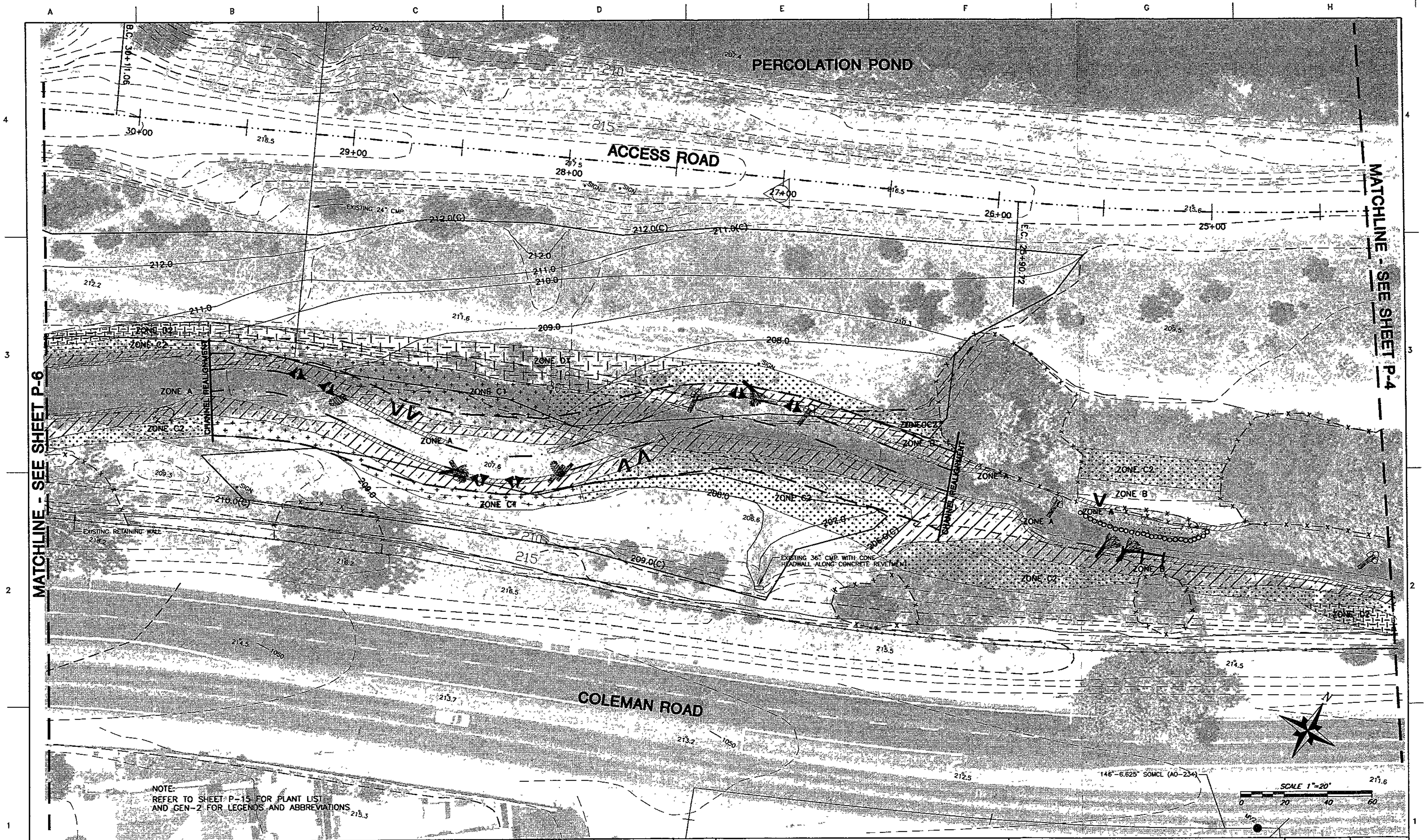
SCALE
AS SHOWN

SHEET
P-4
26 OF 47



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Santa Clara Valley Water District
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DATE

GUADALUPE CREEK RESTORATION PROJECT

PLANTING PLAN

VERIFY SCALES
0 1"
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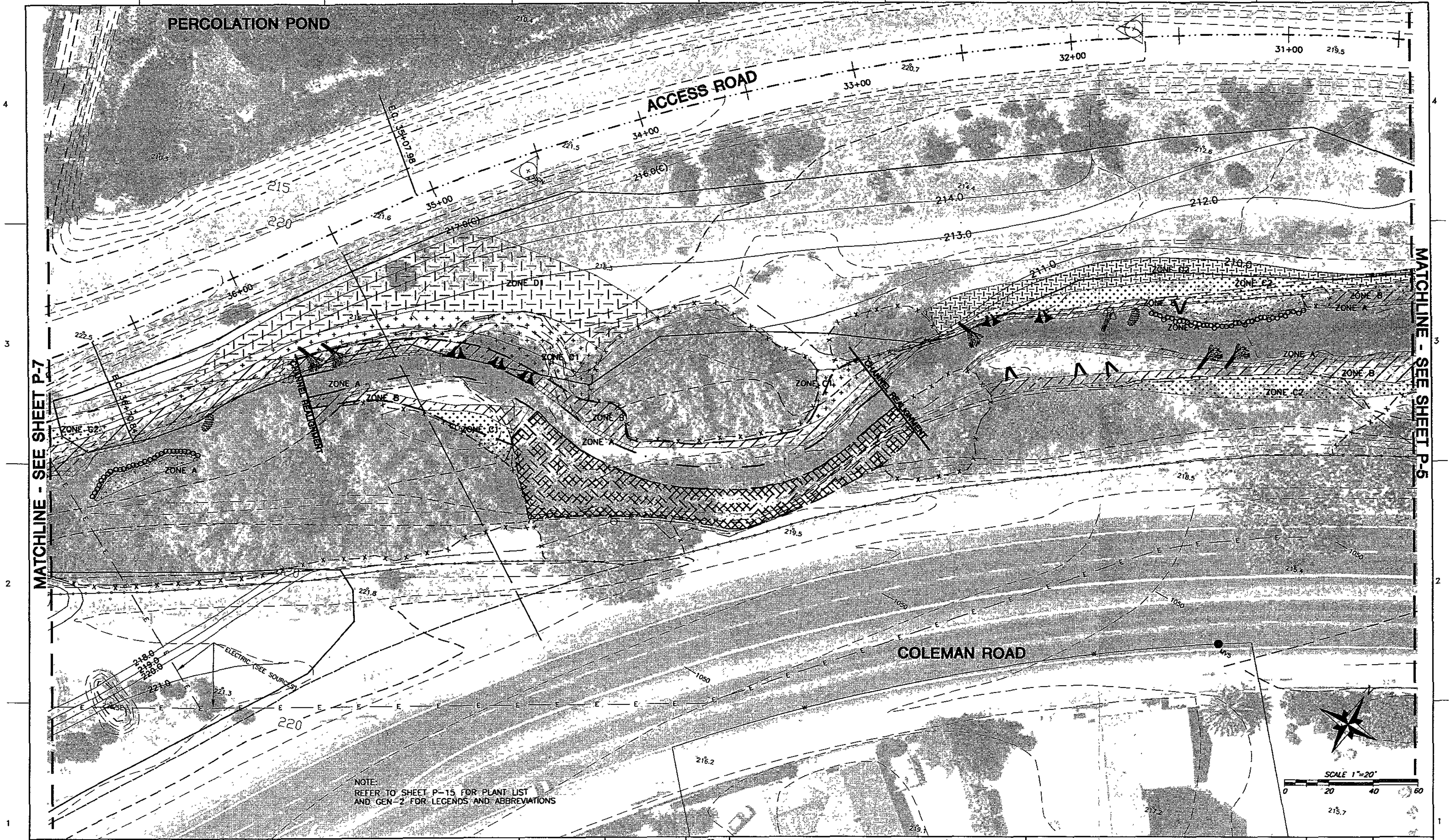
SCALE AS SHOWN
SHEET
P-5
27 OF 47



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GUADALUPE CREEK RESTORATION PROJECT

PLANTING PLAN

VERIFY SCALES
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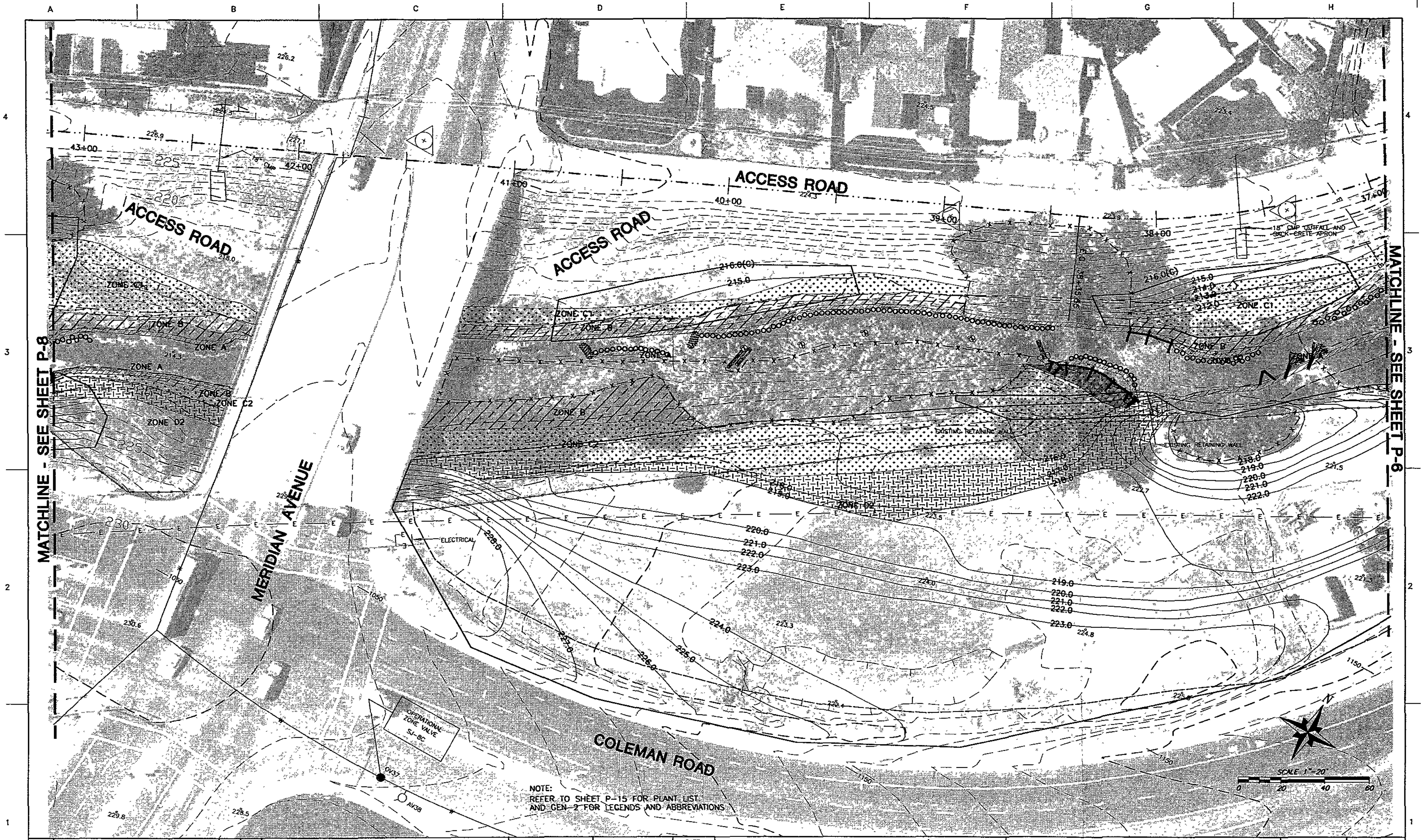
SCALE AS SHOWN

SHEET
P-6
28 OF 47



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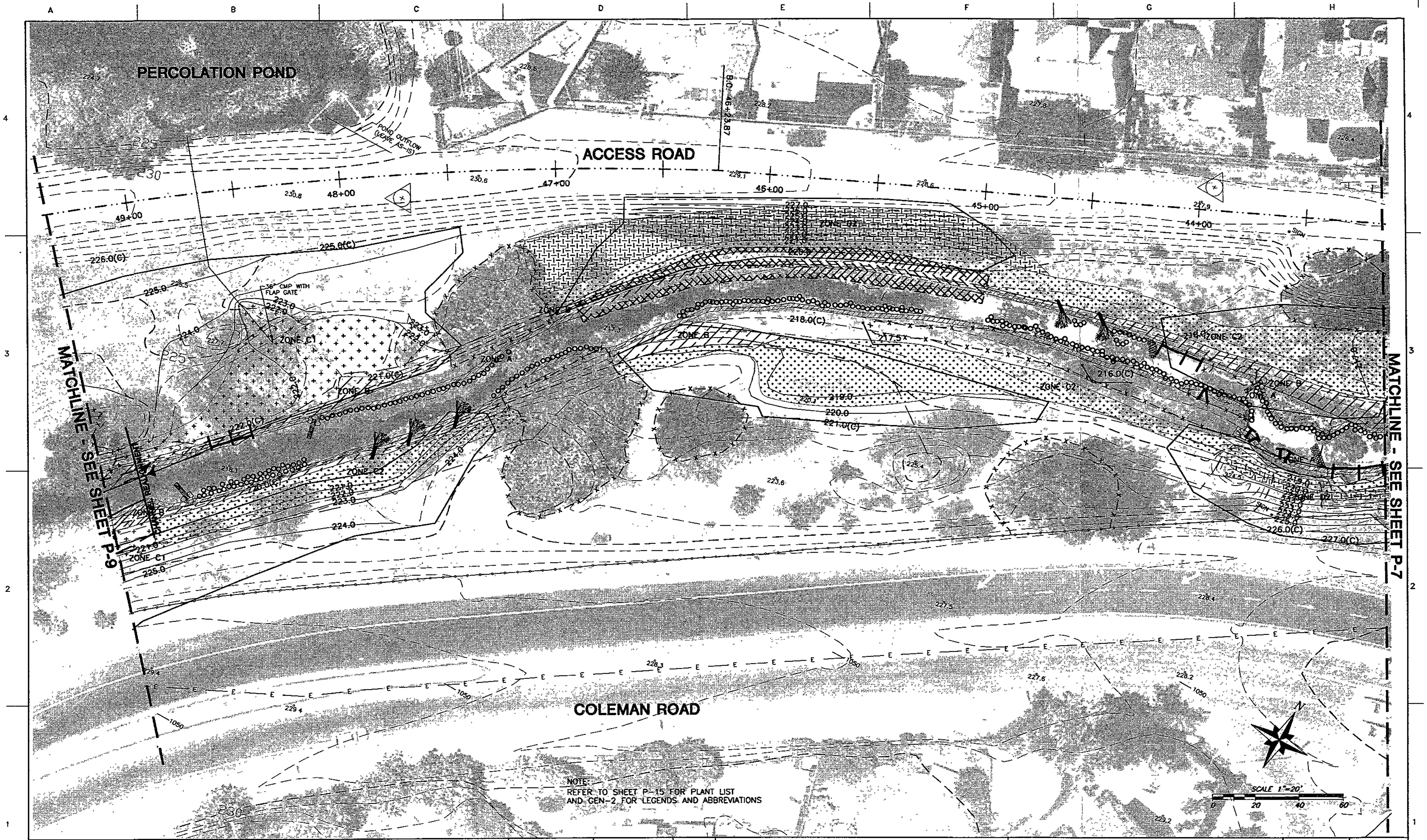
SCALE AS SHOWN

SHEET
P-7
29 OF 47



NOTE:
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AND GEN-2 FOR LEGENDS AND ABBREVIATIONS

REV	DESCRIPTION	DATE	APPR
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Santa Clara Valley Water District
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DATE

GUADALUPE CREEK RESTORATION PROJECT

PLANTING PLAN

VERIFY SCALES
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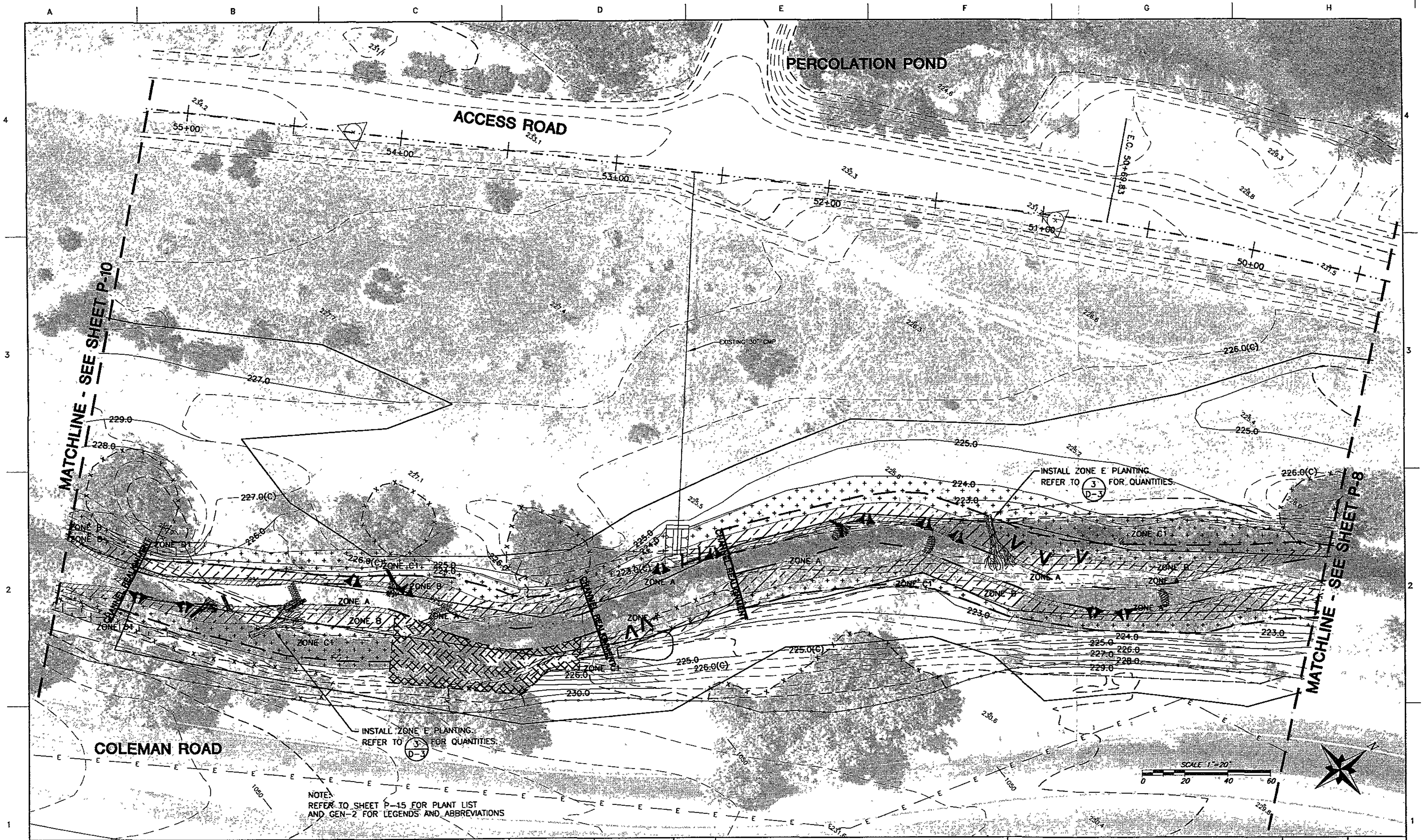
P-8
30 OF 47



NOTE:
REFER TO SHEET P-15 FOR PLANT LIST
AND GEN-2 FOR LEGENDS AND ABBREVIATIONS

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2880 Zanker Rd., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard suite 100c
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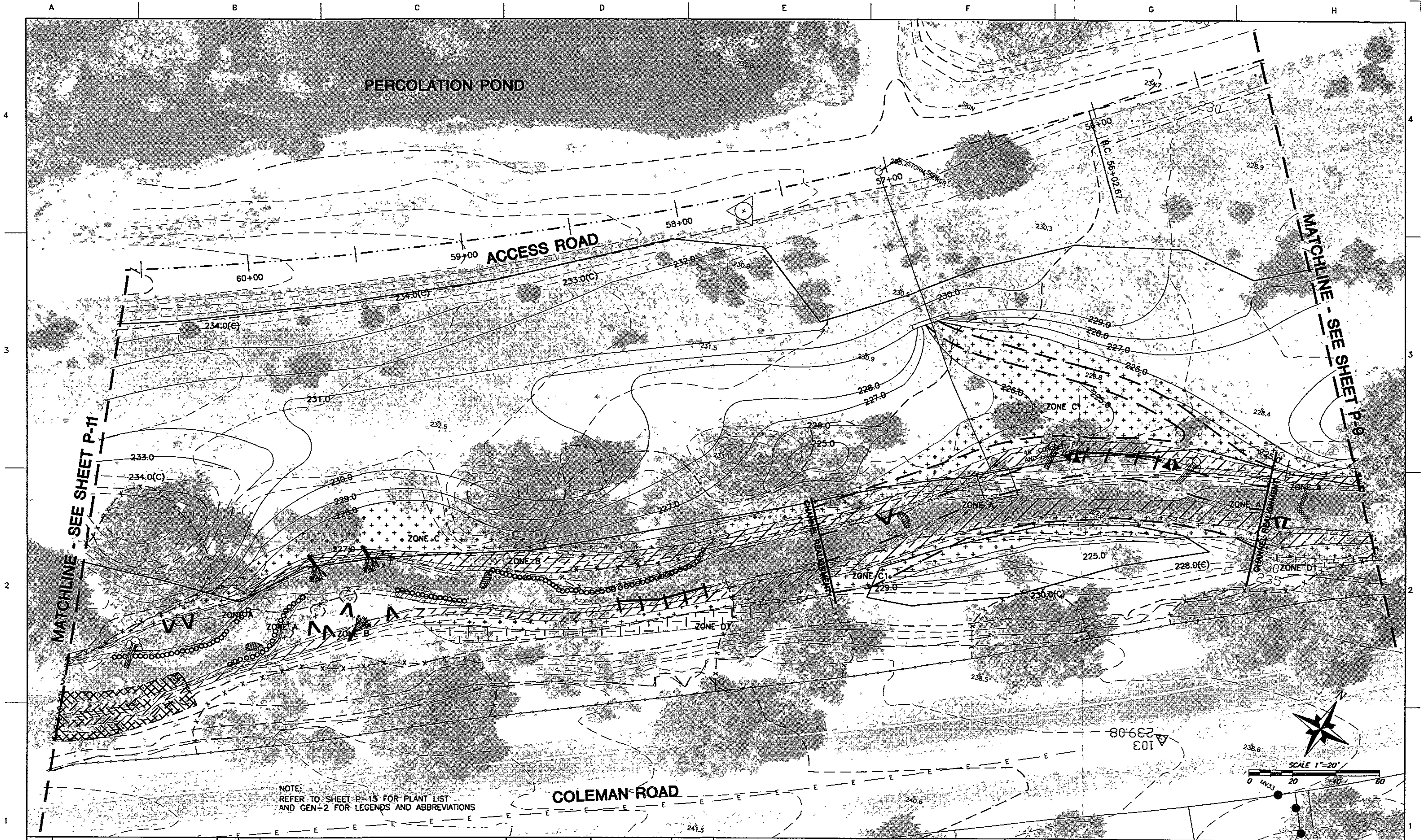
P-9
31 OF 47



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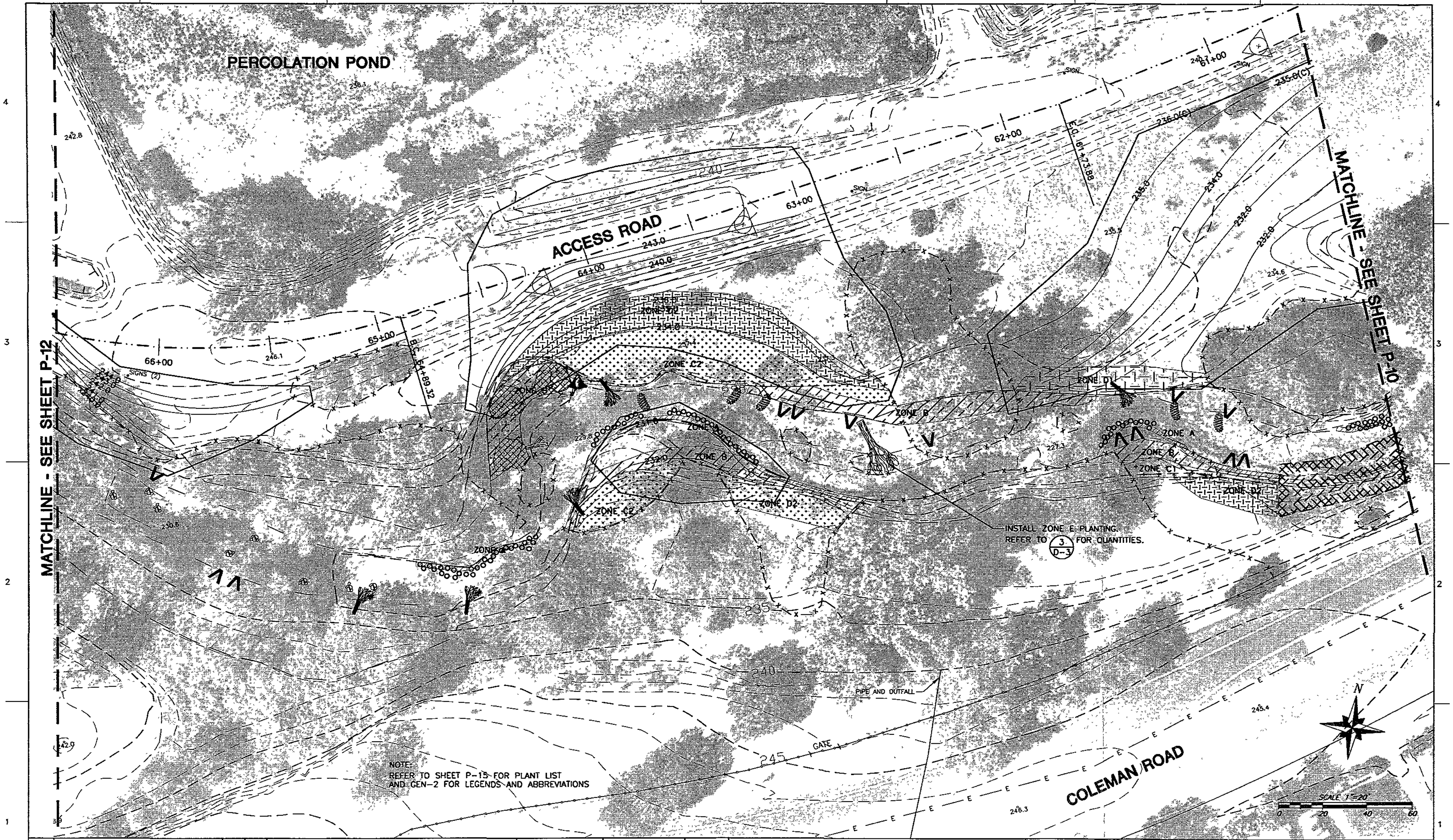
P-10
32 OF 47



INSTALL ZONE E PLANTING. REFER TO (3/D-3) FOR QUANTITIES.

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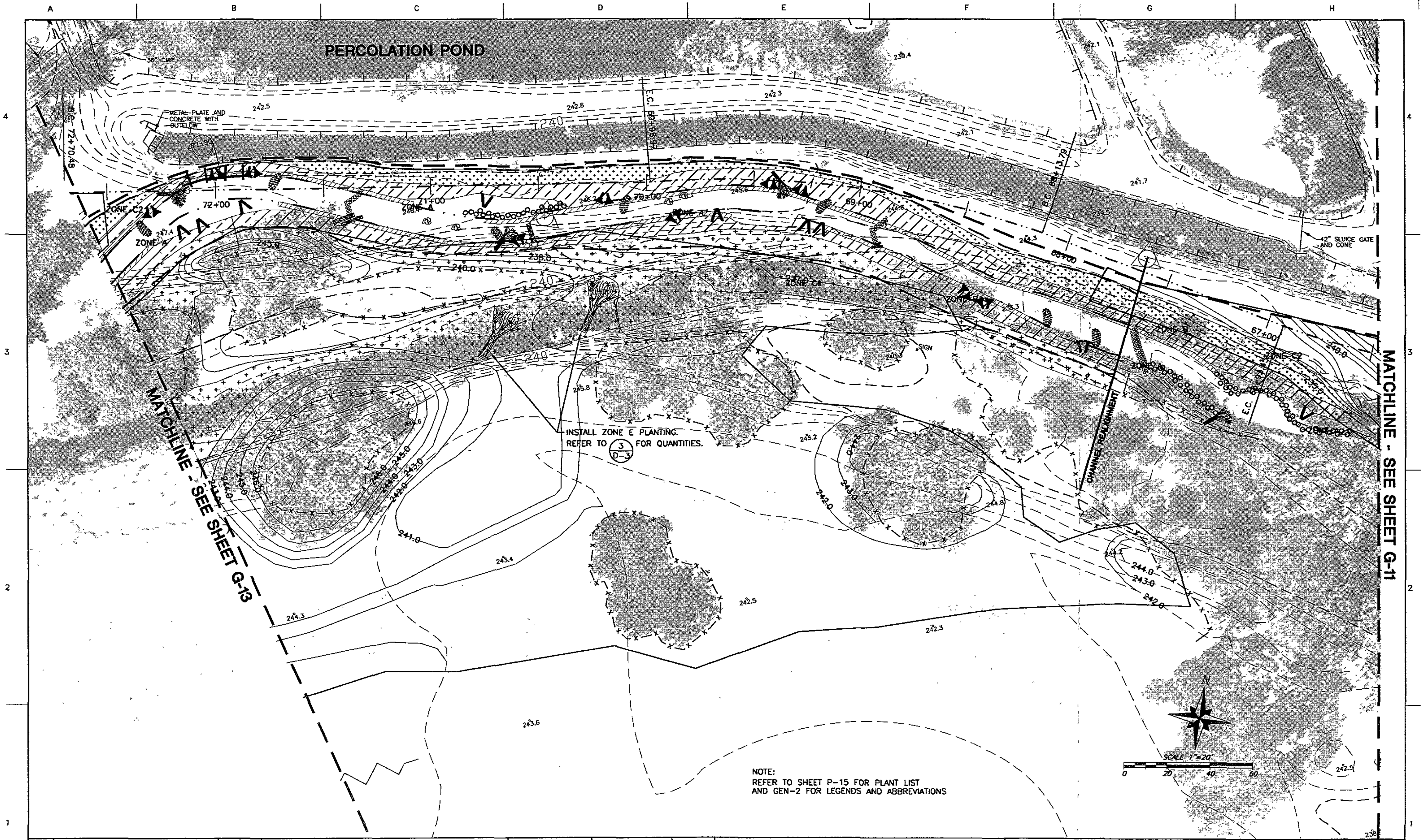

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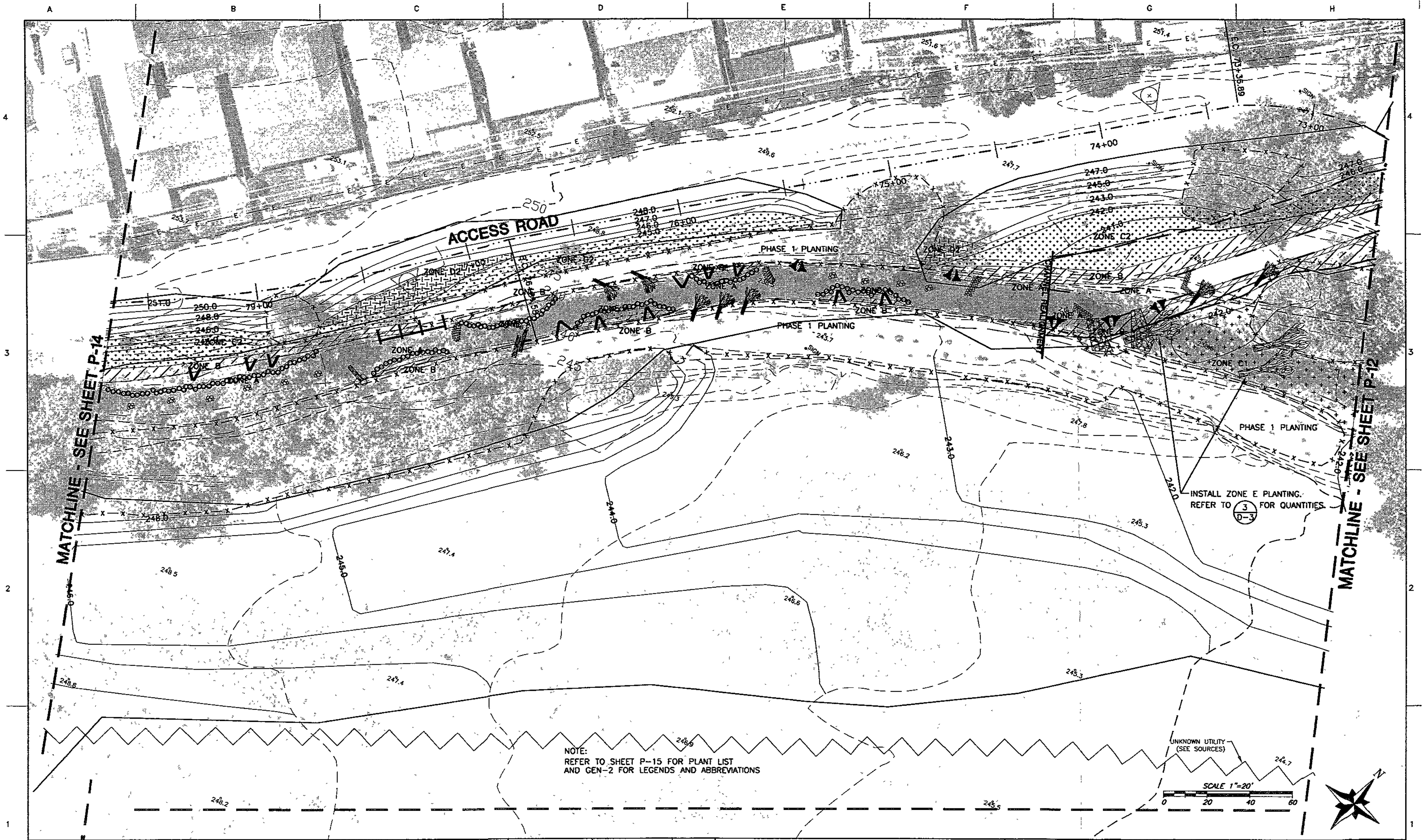

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P-13
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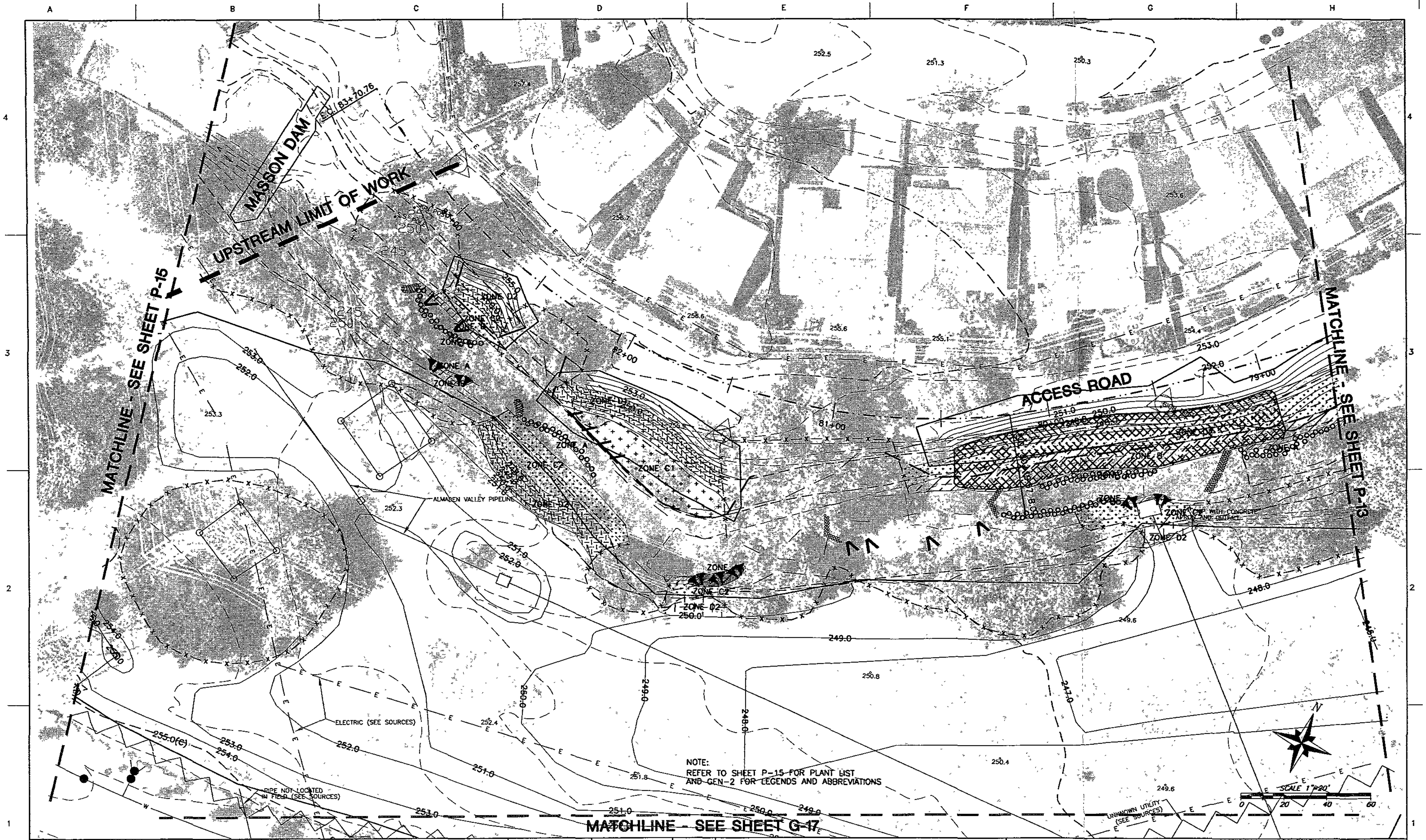

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PLANTING PLAN

PLAN VIEW SYMBOL	PLANTING ZONE	DETAIL REFERENCE	SPECIES NAME		PLANTING PROGRAM				
					ZONE PLANT SPACING	CONTAINER PLANTS		CUTTINGS/ACORNS	
			BOTANICAL	COMMON		SIZE	QUANTITY	TYPE	QUANTITY
▨	A (WATERS EDGE)	1/D-8 5/D-8	ALNUS RHOMBIFOLIA	WHITE ALDER	2	DEEPOTS	1332		0
			BACCHARIS SALICIFOLIA	MULE FAT	2	TREEPOTS	339		0
			PLATANUS RACEMOSA	WESTERN SYCAMORE	2	TREEPOTS	1332		0
			POPULUS FREMONTII	FREMONT COTTONWOOD	2		0	TYPE 1	677
			SALIX EXIGUA	SANDBAR WILLOW	2		0	TYPE 1	677
			SALIX LAEVIGATA	RED WILLOW	2		0	TYPE 1	1684
			SALIX LASIOLEPIS	ARROYO WILLOW	2		0	TYPE 1	677
▧	B (LOWER SLOPE--EXISTING)	3/D-8 4/D-8 6/D-8 1/D-9	ALNUS RHOMBIFOLIA	WHITE ALDER	6	DEEPOTS	107		0
			BACCHARIS SALICIFOLIA	MULE FAT	6	TREEPOTS	210		0
			PLATANUS RACEMOSA	WESTERN SYCAMORE	6	TREEPOTS	210		0
			POPULUS FREMONTII	FREMONT COTTONWOOD	6	TREEPOTS	46	TYPE 2	68
			SALIX EXIGUA	SANDBAR WILLOW	6	TREEPOTS	158	TYPE 2	162
			SALIX LAEVIGATA	RED WILLOW	6	TREEPOTS	308	TYPE 2	314
			SALIX LASIOLEPIS	ARROYO WILLOW	6	TREEPOTS	258	TYPE 2	262
+	C1 (UPPER SLOPE OR LOWER BENCH)	3/D-8 4/D-8 6/D-8 1/D-9	ACER NEGUNDO	BOX ELDER	6	DEEPOTS	237		0
			AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE	6	TREEPOTS	237		0
			BACCHARIS SALICIFOLIA	MULE FAT	6	TREEPOTS	122		0
			PLATANUS RACEMOSA	WESTERN SYCAMORE	6	TREEPOTS	237		0
			POPULUS FREMONTII	FREMONT COTTONWOOD	6	TREEPOTS	122	TYPE 2	154
			QUERCUS AGRIFOLIA	COAST LIVE OAK	6		0	ACORN	154
			QUERCUS LOBATA	VALLEY OAK	6	SUPERCELLS	470		0
			ROSA CALIFORNICA	CALIFORNIA ROSE	6	SUPERCELLS	122		0
			SALIX LASIOLEPIS	ARROYO WILLOW	6	TREEPOTS	170	TYPE 2	243
			SAMBUCUS MEXICANA	ELDERBERRY	6	DEEPOTS	122		0
			UMBELLULARIA CALIFORNICA	CALIFORNIA BAY	6		122		0
⁘	C2 (UPPER SLOPE OR LOWER BENCH--LAWHC)	3/D-8 4/D-8 6/D-8 1/D-9 1/D-9	ACER NEGUNDO	BOX ELDER	6	DEEPOTS	234		0
			AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE	6	TREEPOTS	234		0
			ARTEMISIA CALIFORNICA	CALIFORNIA SAGEBRUSH	6	DEEPOTS	0		0
			BACCHARIS SALICIFOLIA	MULE FAT	6	TREEPOTS	119		0
			PLATANUS RACEMOSA	WESTERN SYCAMORE	6	TREEPOTS	575		0
			POPULUS FREMONTII	FREMONT COTTONWOOD	6	TREEPOTS	0	TYPE 2	213
			QUERCUS LOBATA	VALLEY OAK	6	SUPERCELLS	348		0
			ROSA CALIFORNICA	CALIFORNIA ROSE	6	SUPERCELLS	76		0
			SALIX LASIOLEPIS	ARROYO WILLOW	6	TREEPOTS	177	TYPE 2	162
			SAMBUCUS MEXICANA	ELDERBERRY	6	DEEPOTS	52		0
			UMBELLULARIA CALIFORNICA	CALIFORNIA BAY	6		119		0
╪	D1 (UPPER BENCH)	5/D-8 2/D-9	ACER NEGUNDO	BOX ELDER	12	DEEPOTS	8		0
			AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE	12	TREEPOTS	11		0
			ARTEMISIA CALIFORNICA	CALIFORNIA SAGEBRUSH	12	DEEPOTS	8		0
			BACCHARIS PILULARIS	COYOTE BRUSH	12		7		0
			QUERCUS AGRIFOLIA	COAST LIVE OAK	12		0	ACORN	19
			QUERCUS DOUGLASII	BLUE OAK	12	SUPERCELLS	11		0
			QUERCUS LOBATA	VALLEY OAK	12	SUPERCELLS	19		0
			ROSA CALIFORNICA	CALIFORNIA ROSE	12	SUPERCELLS	8		0
			SAMBUCUS MEXICANA	ELDERBERRY	12	DEEPOTS	11		0
			SYMPHORICARPUS ALBUS	SNOWBERRY	12		7		0
			UMBELLULARIA CALIFORNICA	CALIFORNIA BAY	12		11		0
▦	D2 (UPPER BENCH--LAWHC)	5/D-8 2/D-9	AESCULUS CALIFORNICA	CALIFORNIA BUCKEYE	12	TREEPOTS	20		0
			ARTEMISIA CALIFORNICA	CALIFORNIA SAGEBRUSH	12	DEEPOTS	10		0
			BACCHARIS PILULARIS	COYOTE BRUSH	12		10		0
			QUERCUS AGRIFOLIA	COAST LIVE OAK	12		0	ACORN	33
			QUERCUS DOUGLASII	BLUE OAK	12	SUPERCELLS	31		0
			QUERCUS LOBATA	VALLEY OAK	12	SUPERCELLS	10		0
			ROSA CALIFORNICA	CALIFORNIA ROSE	12	SUPERCELLS	10		0
			SAMBUCUS MEXICANA	ELDERBERRY	12	DEEPOTS	15		0
			UMBELLULARIA CALIFORNICA	CALIFORNIA BAY	12		10		0
▩	E (BAR SURFACE)	2/D-8 5/D-8	ALNUS RHOMBIFOLIA	WHITE ALDER		DEEPOTS	342		0
			BACCHARIS SALICIFOLIA	MULE FAT		TREEPOTS	342		0
			PLATANUS RACEMOSA	WESTERN SYCAMORE		TREEPOTS	900		0
			POPULUS FREMONTII	FREMONT COTTONWOOD		TREEPOTS	51	TYPE 2	80
			SALIX EXIGUA	SANDBAR WILLOW		TREEPOTS	51	TYPE 2	80
			SALIX LAEVIGATA	RED WILLOW		TREEPOTS	165	TYPE 2	205
			SALIX LASIOLEPIS	ARROYO WILLOW		TREEPOTS	51	TYPE 2	80
						Total	10314		5944

NOTE: SEE 4/D-9 FOR PLANTING ZONES CROSS-SECTION

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P-15
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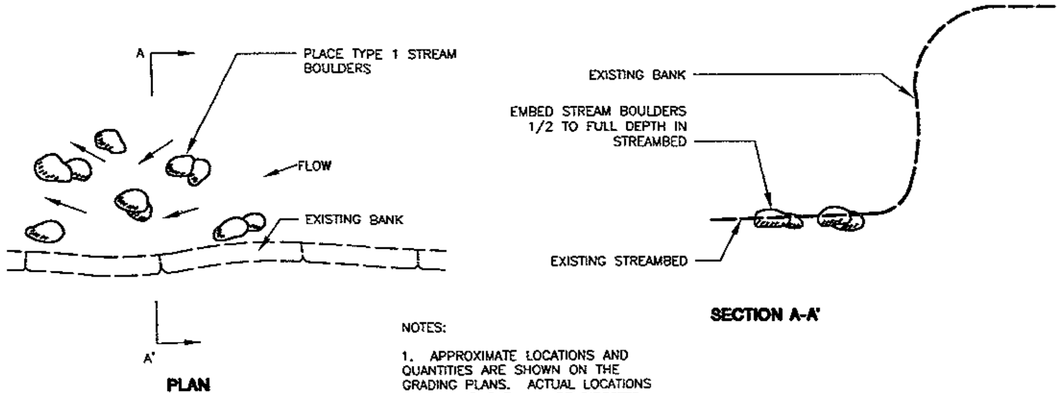
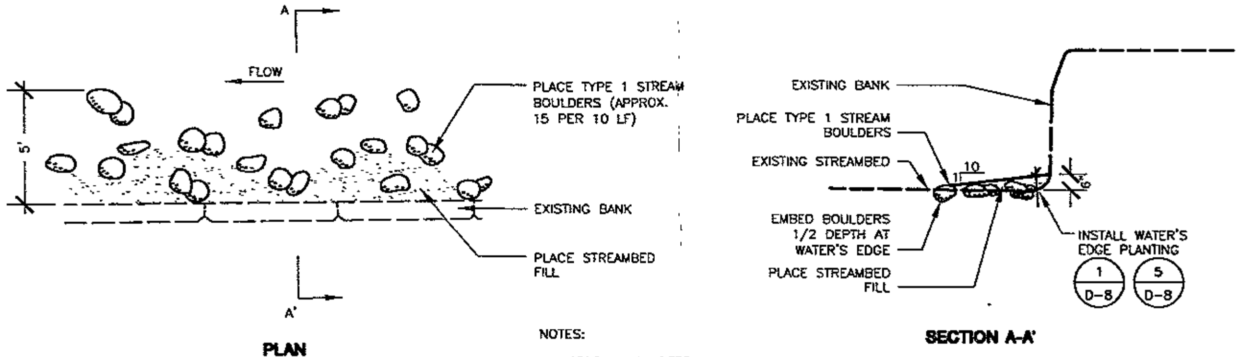

A
PLACE TYPE 1 STREAM BOULDERS
FLOW
EXISTING BANK
A'
PLAN
EXISTING BANK
EMBED STREAM BOULDERS 1/2 TO FULL DEPTH IN STREAMBED
EXISTING STREAMBED
SECTION A-A'

NOTES:

1. APPROXIMATE LOCATIONS AND QUANTITIES ARE SHOWN ON THE GRADING PLANS. ACTUAL LOCATIONS AND PLACEMENT WILL BE DIRECTED BY ENGINEER.

1/D-1 STREAM BOULDER PLACEMENT

Not To Scale


A
FLOW
5'
PLACE TYPE 1 STREAM BOULDERS (APPROX. 15 PER 10 LF)
EXISTING BANK
PLACE STREAMBED FILL
A'
PLAN
EXISTING BANK
PLACE TYPE 1 STREAM BOULDERS
EXISTING STREAMBED
10
1
6"
EMBED BOULDERS 1/2 DEPTH AT WATER'S EDGE
PLACE STREAMBED FILL
INSTALL WATER'S EDGE PLANTING
1/D-8
5/D-8
SECTION A-A'

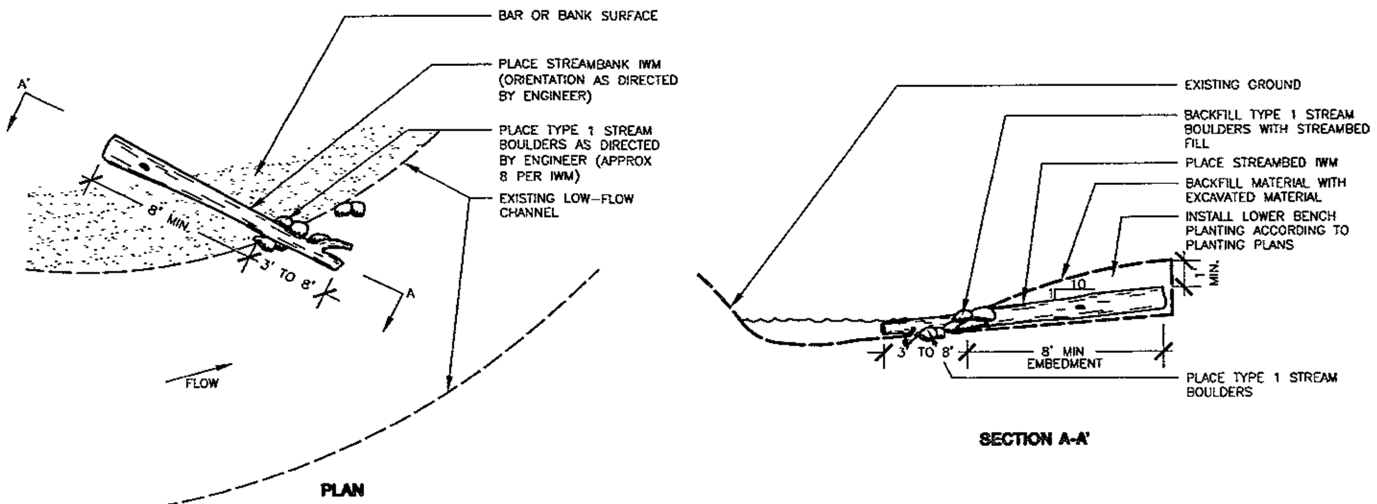
NOTES:

1. STREAM BOULDERS WILL BE PLACED FIRST TO FORM IRREGULAR EDGE. STREAMBED FILL WILL BE PLACED OVER EXISTING STREAMBED AND PLACED STREAM BOULDERS.

2. INSTALL PLANTS AT TOE OF EXISTING BANK.

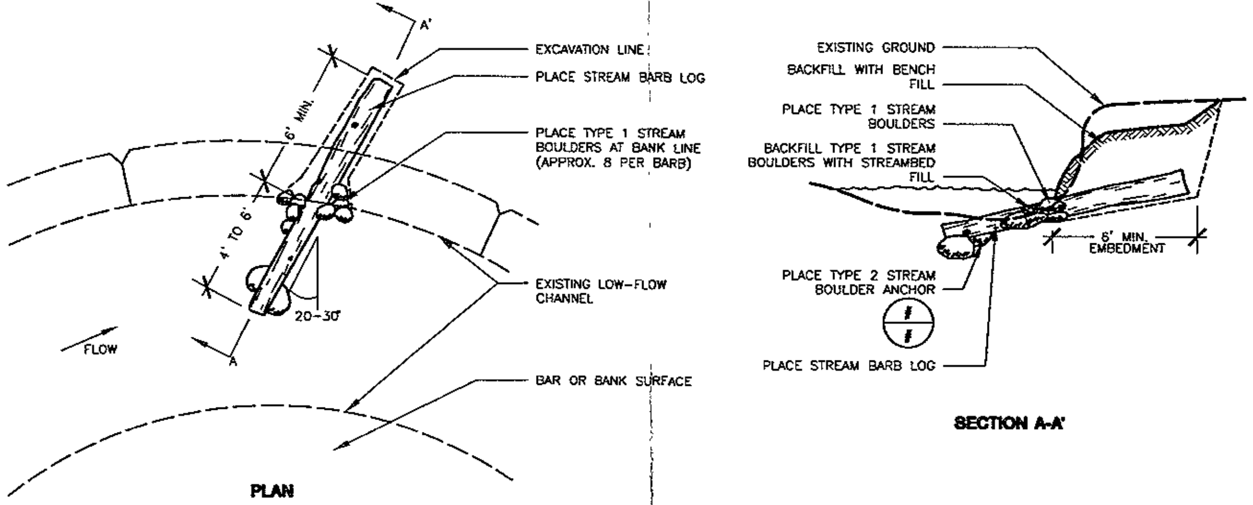
2/D-1 WATER'S EDGE TREATMENT

Not To Scale


A'
BAR OR BANK SURFACE
PLACE STREAMBANK IWM (ORIENTATION AS DIRECTED BY ENGINEER)
PLACE TYPE 1 STREAM BOULDERS AS DIRECTED BY ENGINEER (APPROX 8 PER IWM)
EXISTING LOW-FLOW CHANNEL
8' MIN.
3' TO 8'
A
FLOW
PLAN
EXISTING GROUND
BACKFILL TYPE 1 STREAM BOULDERS WITH STREAMBED FILL
PLACE STREAMBED IWM
BACKFILL MATERIAL WITH EXCAVATED MATERIAL
INSTALL LOWER BENCH PLANTING ACCORDING TO PLANTING PLANS
1' MIN.
10
1
3' TO 8'
8' MIN EMBEDMENT
PLACE TYPE 1 STREAM BOULDERS
SECTION A-A'

3/D-1 STREAMBANK INSTREAM WOODY MATERIAL (IWM)

Not To Scale


A'
EXCAVATION LINE
PLACE STREAM BARB LOG
6' MIN.
PLACE TYPE 1 STREAM BOULDERS AT BANK LINE (APPROX. 8 PER BARB)
4' TO 6'
20-30°
EXISTING LOW-FLOW CHANNEL
FLOW
A
BAR OR BANK SURFACE
PLAN
EXISTING GROUND
BACKFILL WITH BENCH FILL
PLACE TYPE 1 STREAM BOULDERS
BACKFILL TYPE 1 STREAM BOULDERS WITH STREAMBED FILL
6' MIN. EMBEDMENT
PLACE TYPE 2 STREAM BOULDER ANCHOR
PLACE STREAM BARB LOG
SECTION A-A'

4/D-1 STREAM BARB

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INSTREAM STRUCTURES DETAILS

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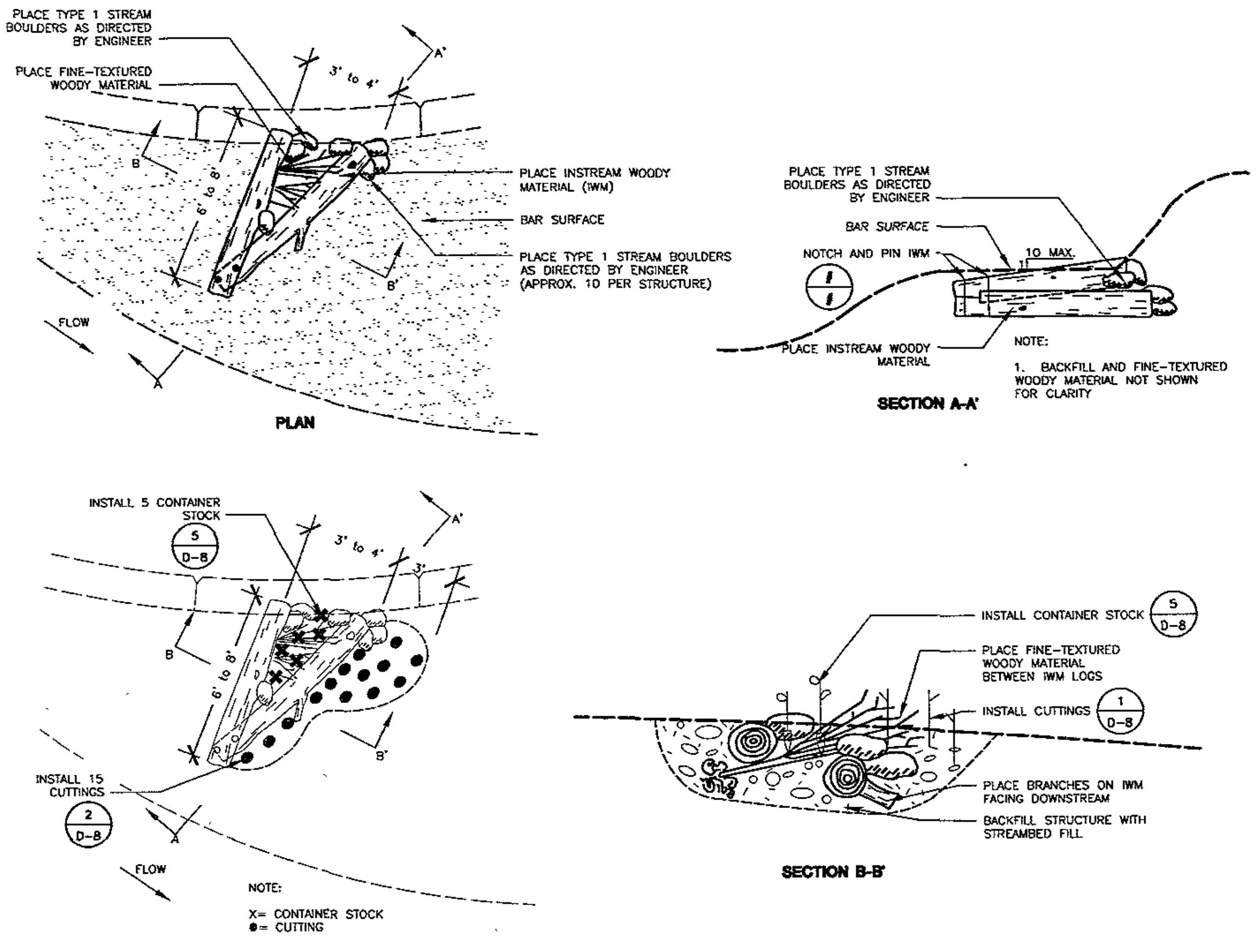
PLACE TYPE 1 STREAM BOULDERS AS DIRECTED BY ENGINEER
PLACE FINE-TEXTURED WOODY MATERIAL
3' to 4'
A'
B
6' to 8'
PLACE INSTREAM WOODY MATERIAL (IWM)
BAR SURFACE
PLACE TYPE 1 STREAM BOULDERS AS DIRECTED BY ENGINEER (APPROX. 10 PER STRUCTURE)
B'
FLOW
A
PLAN
PLACE TYPE 1 STREAM BOULDERS AS DIRECTED BY ENGINEER
BAR SURFACE
NOTCH AND PIN IWM
10 MAX.
PLACE INSTREAM WOODY MATERIAL
NOTE:
1. BACKFILL AND FINE-TEXTURED WOODY MATERIAL NOT SHOWN FOR CLARITY
SECTION A-A'
INSTALL 5 CONTAINER STOCK
5 / D-8
3' to 4'
3'
A'
B
6' to 8'
B'
INSTALL 15 CUTTINGS
2 / D-8
A
FLOW
NOTE:
X= CONTAINER STOCK
●= CUTTING
PLAN
INSTALL CONTAINER STOCK 5 / D-8
PLACE FINE-TEXTURED WOODY MATERIAL BETWEEN IWM LOGS
INSTALL CUTTINGS 1 / D-8
PLACE BRANCHES ON IWM FACING DOWNSTREAM
BACKFILL STRUCTURE WITH STREAMBED FILL
SECTION B-B'

1 / D-2 BAR INSTREAM WOODY MATERIAL (IWM)

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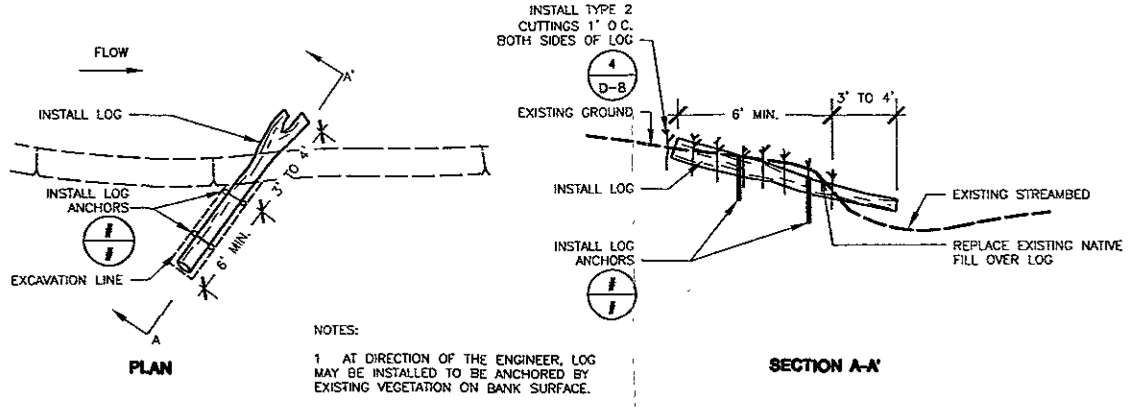
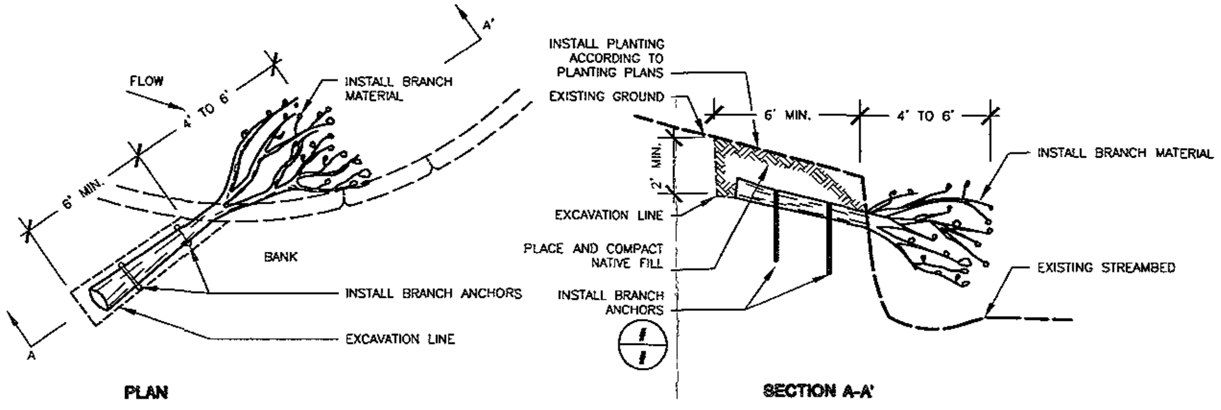


NOTES:

1. AT DIRECTION OF THE ENGINEER, LOG MAY BE INSTALLED TO BE ANCHORED BY EXISTING VEGETATION ON BANK SURFACE.

2 / D-2 OFF-BANK LOG COVER

Not To Scale



3 / D-2 OFF-BANK BRANCH COVER

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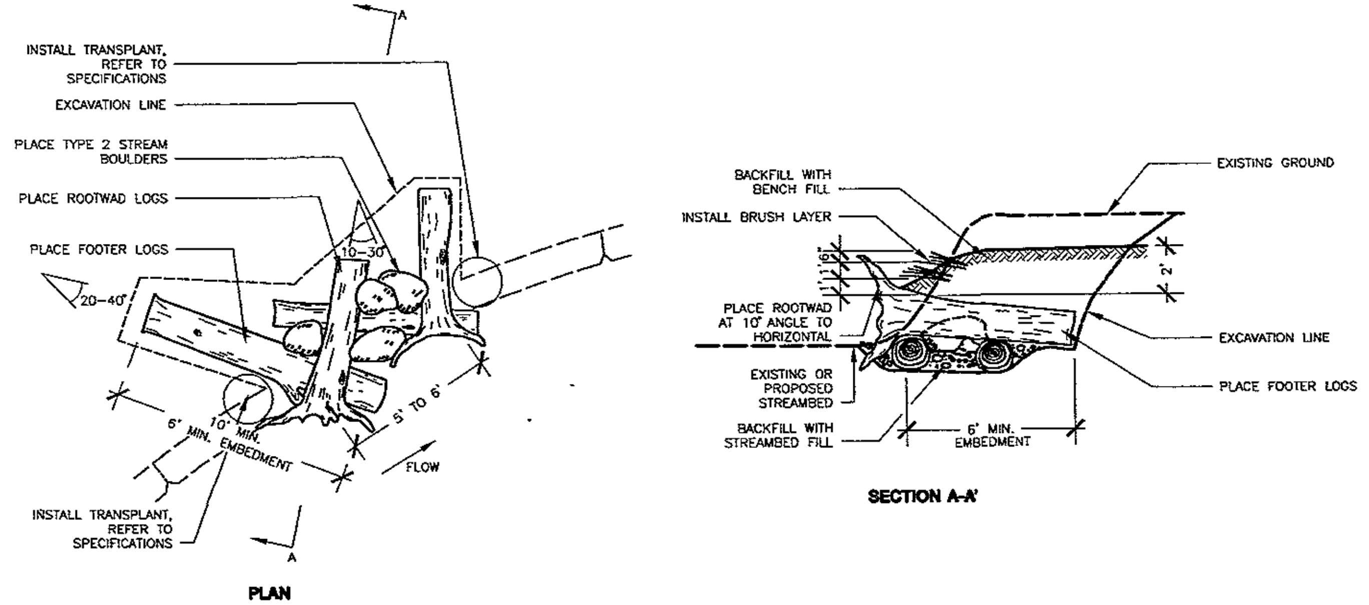
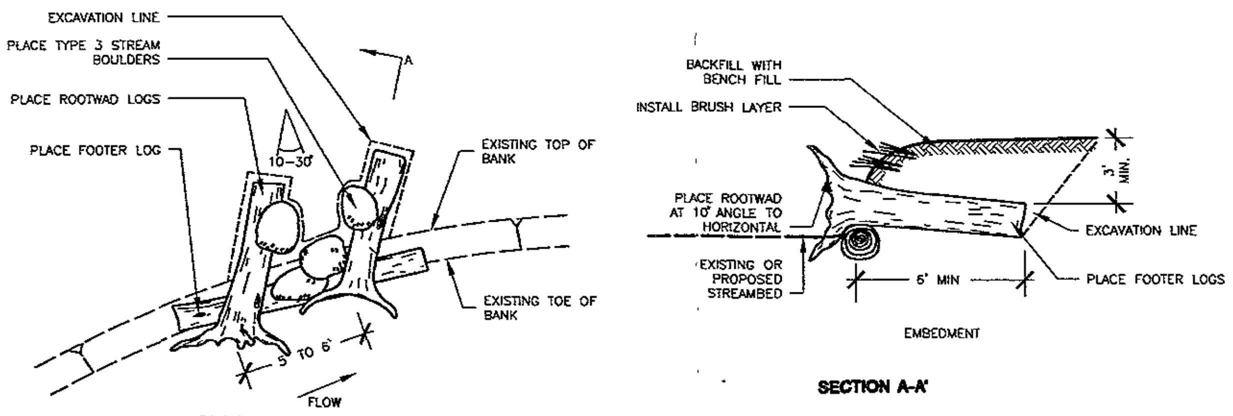


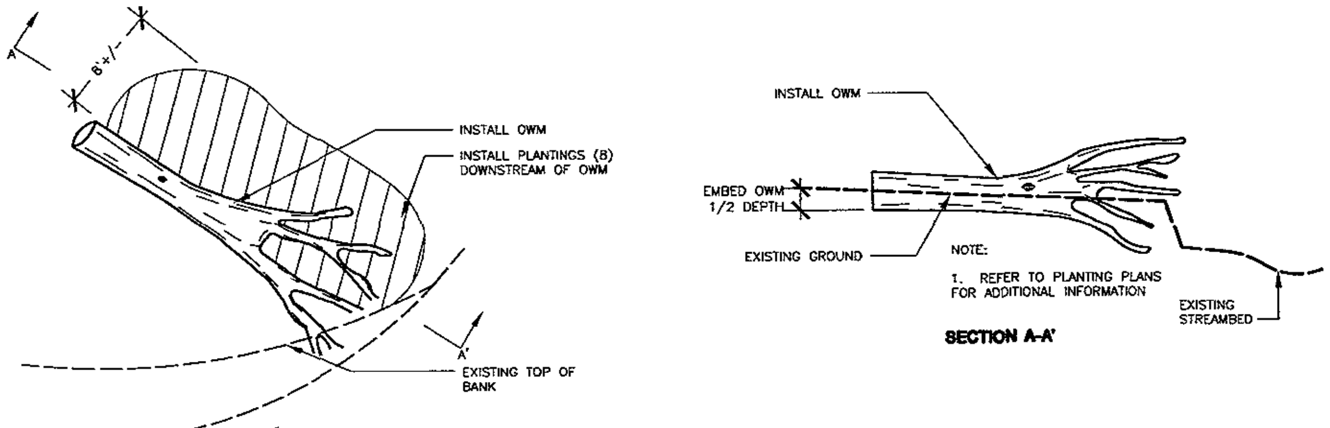
1 ROOTWAD BANK STRUCTURE - TYPE 1

D-3 Not To Scale



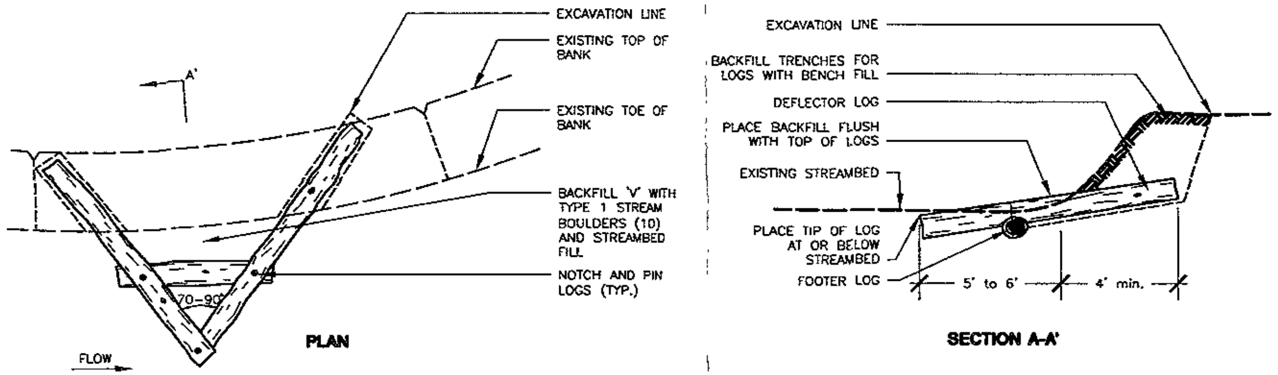
2 ROOTWAD BANK STRUCTURE - TYPE 2

D-3 Not To Scale



3 OVERBANK WOODY MATERIAL (OWM)

D-3 Not To Scale


A'
EXCAVATION LINE
EXISTING TOP OF BANK
EXISTING TOE OF BANK
BACKFILL 'V' WITH TYPE 1 STREAM BOULDERS (10) AND STREAMBED FILL
NOTCH AND PIN LOGS (TYP.)
70–90°
FLOW
PLAN
A
EXCAVATION LINE
BACKFILL TRENCHES FOR LOGS WITH BENCH FILL
DEFLECTOR LOG
PLACE BACKFILL FLUSH WITH TOP OF LOGS
EXISTING STREAMBED
PLACE TIP OF LOG AT OR BELOW STREAMBED
FOOTER LOG
5' to 6'
4' min.
SECTION A-A'

4 WING DEFLECTOR

D-3 Not To Scale

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

Jones & Stokes
2880 Zanker Rd., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard suite 100c
west sacramento, california 95691-3430

CONSULTANT STAMP

CONSULTANT STAMP

DATE 7/17/00
DESIGN A.R./E.W.
DRAWN S.A.B.
CHECKED E.W./J.Z.

Santa Clara Valley Water District

ACCEPTED BY DISTRICT

DATE

GUADALUPE CREEK RESTORATION PROJECT

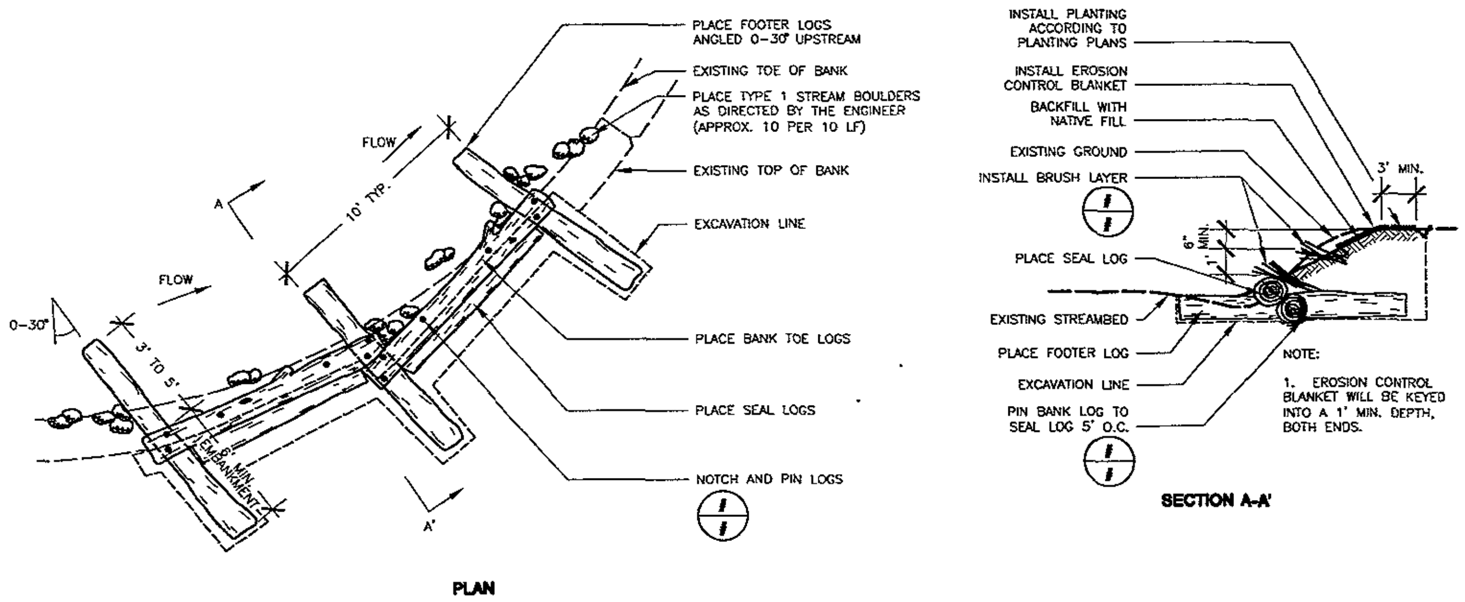
INSTREAM STRUCTURES DETAILS

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE AS SHOWN

SHEET D-3

40 OF 47

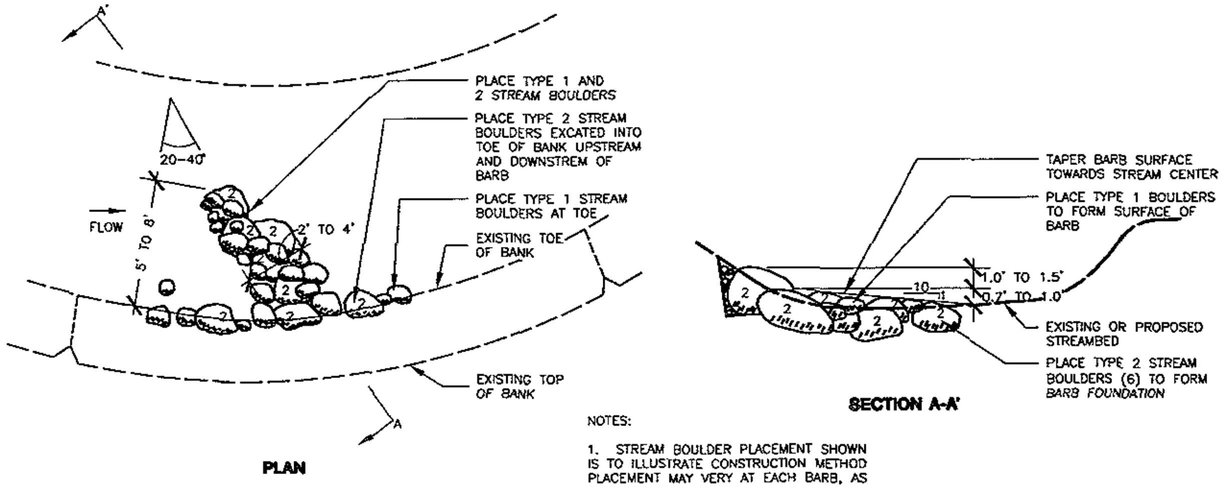


NOTE:

1. EROSION CONTROL BLANKET WILL BE KEYED INTO A 1' MIN. DEPTH, BOTH ENDS.

1 / D-4 LOG TOE BANK STRUCTURE

Not To Scale

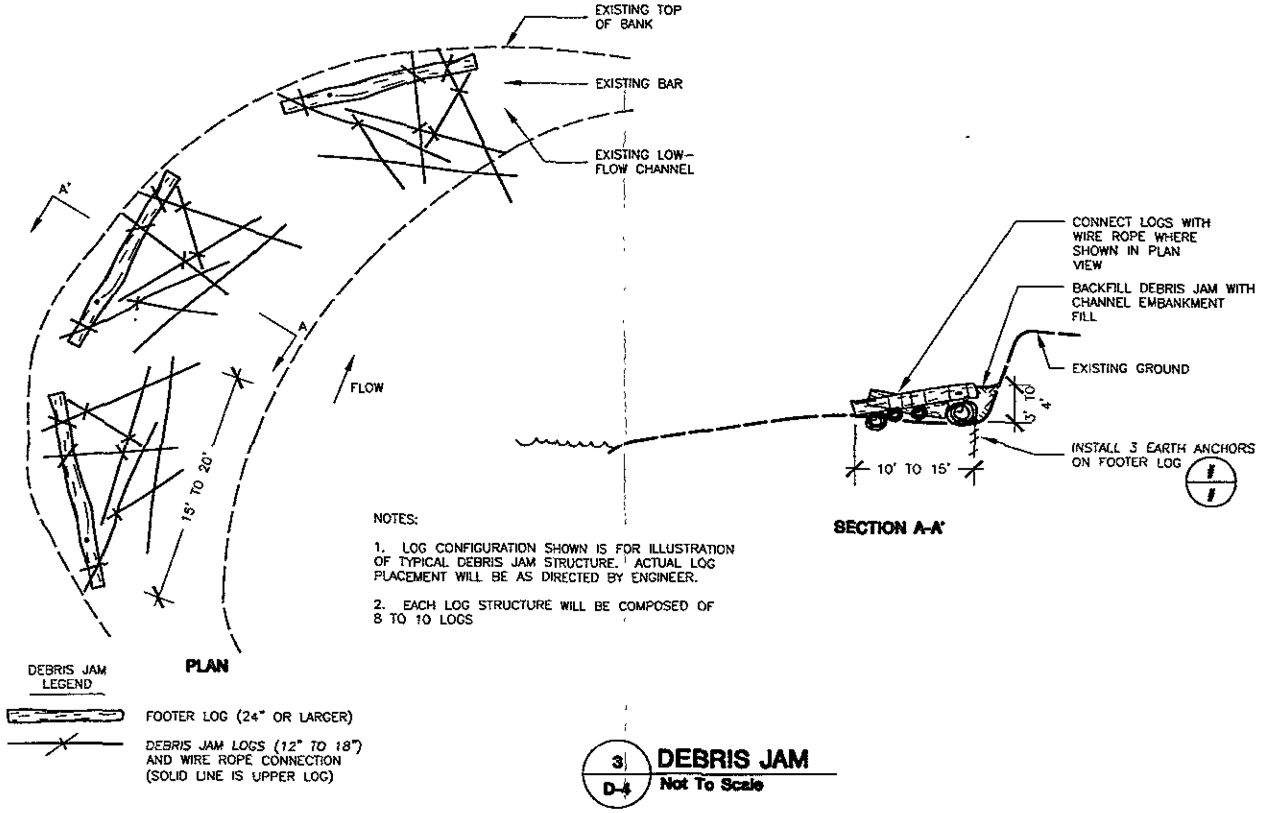

PLACE TYPE 1 AND 2 STREAM BOULDERS
PLACE TYPE 2 STREAM BOULDERS EXCATED INTO TOE OF BANK UPSTREAM AND DOWNSTREM OF BARB
PLACE TYPE 1 STREAM BOULDERS AT TOE
EXISTING TOE OF BANK
EXISTING TOP OF BANK
FLOW
20–40°
5' TO 8'
2' TO 4'
2
A'
A
PLAN
TAPER BARB SURFACE TOWARDS STREAM CENTER
PLACE TYPE 1 BOULDERS TO FORM SURFACE OF BARB
1.0' TO 1.5'
0.7' TO 1.0'
10
1
EXISTING OR PROPOSED STREAMBED
PLACE TYPE 2 STREAM BOULDERS (6) TO FORM BARB FOUNDATION
SECTION A-A'

NOTES:

1. STREAM BOULDER PLACEMENT SHOWN IS TO ILLUSTRATE CONSTRUCTION METHOD PLACEMENT MAY VERY AT EACH BARB, AS DIRECTED BY ENGINEER.

2 / D-4 ROCK STREAM BARB

Not To Scale


EXISTING TOP OF BANK
EXISTING BAR
EXISTING LOW-FLOW CHANNEL
A'
A
FLOW
15' TO 20'
PLAN
CONNECT LOGS WITH WIRE ROPE WHERE SHOWN IN PLAN VIEW
BACKFILL DEBRIS JAM WITH CHANNEL EMBANKMENT FILL
EXISTING GROUND
INSTALL 3 EARTH ANCHORS ON FOOTER LOG
3' TO 4'
10' TO 15'
SECTION A-A'

NOTES:

1. LOG CONFIGURATION SHOWN IS FOR ILLUSTRATION OF TYPICAL DEBRIS JAM STRUCTURE. ACTUAL LOG PLACEMENT WILL BE AS DIRECTED BY ENGINEER.

2. EACH LOG STRUCTURE WILL BE COMPOSED OF 8 TO 10 LOGS

DEBRIS JAM LEGEND

FOOTER LOG (24" OR LARGER)

DEBRIS JAM LOGS (12" TO 18") AND WIRE ROPE CONNECTION (SOLID LINE IS UPPER LOG)

3 / D-4 DEBRIS JAM

Not To Scale

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INSTREAM STRUCTURES DETAILS

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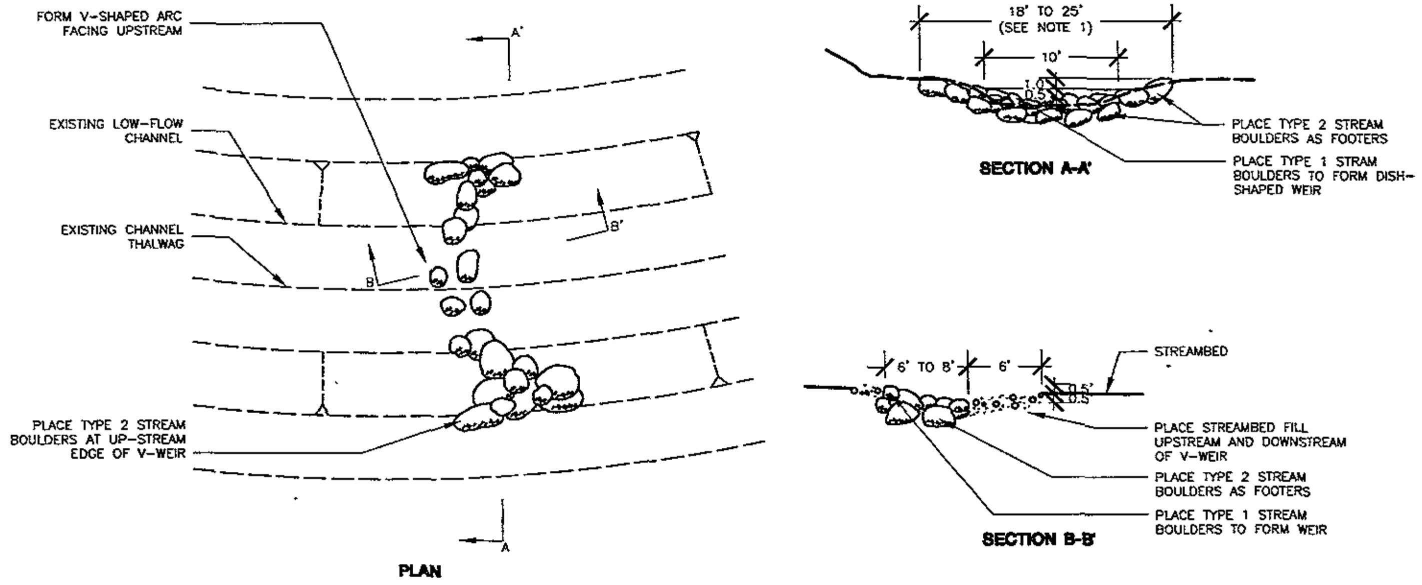
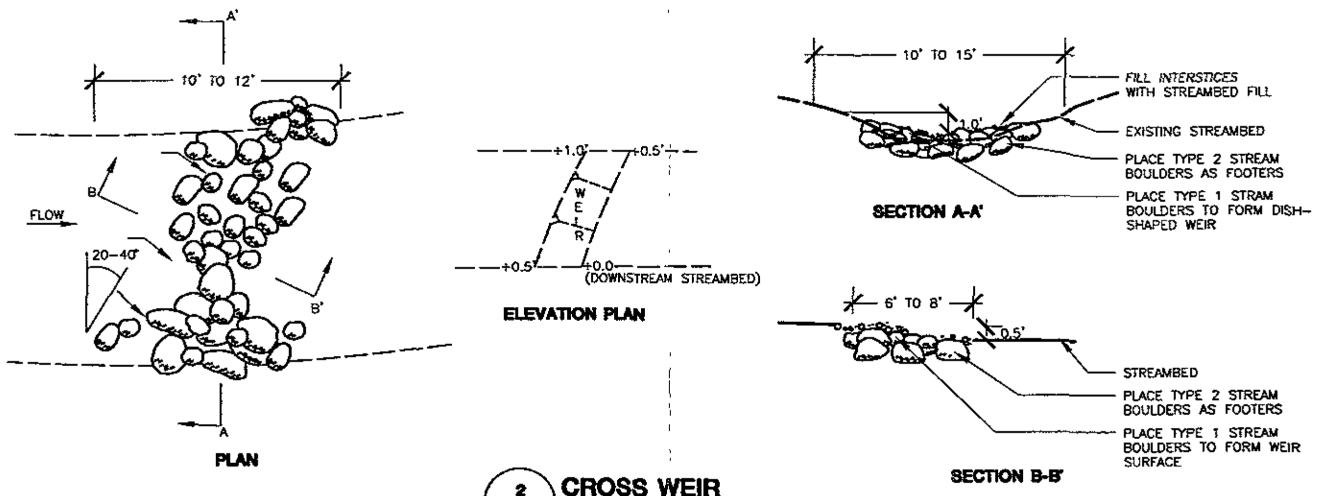
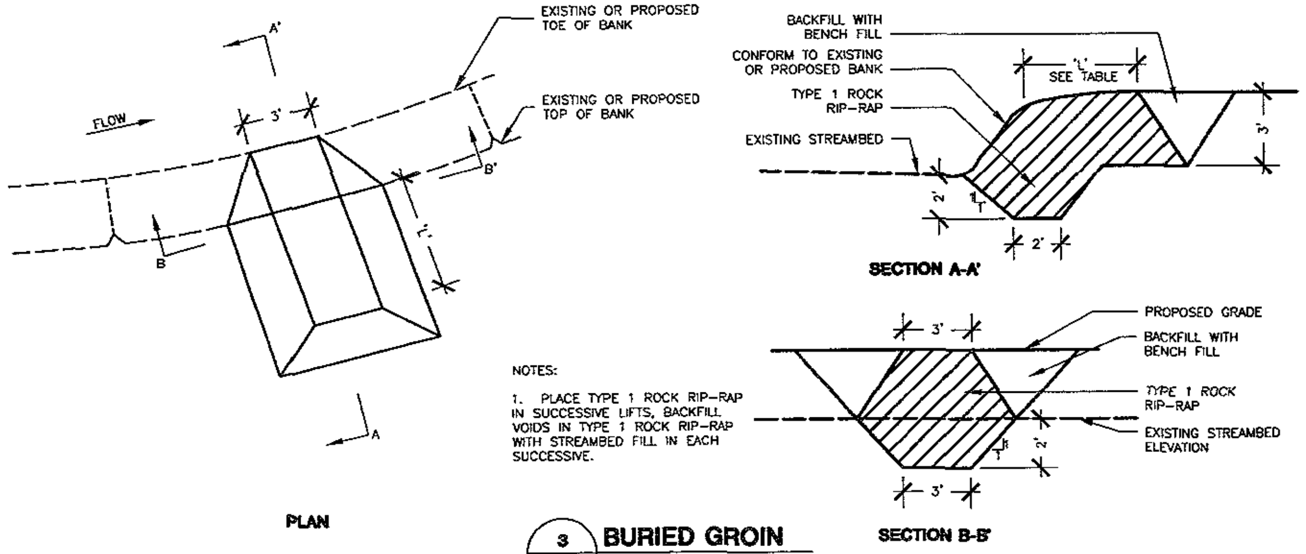
SCALE AS SHOWN
SHEET
D-4
41 OF 47


FORM V-SHAPED ARC FACING UPSTREAM
A'
EXISTING LOW-FLOW CHANNEL
B'
EXISTING CHANNEL THALWAG
B
PLACE TYPE 2 STREAM BOULDERS AT UP-STREAM EDGE OF V-WEIR
A
PLAN
18' TO 25' (SEE NOTE 1)
10'
1.0'
0.5'
PLACE TYPE 2 STREAM BOULDERS AS FOOTERS
PLACE TYPE 1 STRAM BOULDERS TO FORM DISH-SHAPED WEIR
SECTION A-A'
6' TO 8'
6'
STREAMBED
0.5'
0.5'
PLACE STREAMBED FILL UPSTREAM AND DOWNSTREAM OF V-WEIR
PLACE TYPE 2 STREAM BOULDERS AS FOOTERS
PLACE TYPE 1 STREAM BOULDERS TO FORM WEIR
SECTION B-B'

1 / D-5 V-WEIR
Not To Scale


A'
10' TO 12'
B
FLOW
20-40°
B'
A
PLAN
+1.0'
+0.5'
WEIR
+0.5'
+0.0
(DOWNSTREAM STREAMBED)
ELEVATION PLAN
10' TO 15'
FILL INTERSTICES WITH STREAMBED FILL
1.0'
EXISTING STREAMBED
PLACE TYPE 2 STREAM BOULDERS AS FOOTERS
PLACE TYPE 1 STRAM BOULDERS TO FORM DISH-SHAPED WEIR
SECTION A-A'
6' TO 8'
0.5'
STREAMBED
PLACE TYPE 2 STREAM BOULDERS AS FOOTERS
PLACE TYPE 1 STREAM BOULDERS TO FORM WEIR SURFACE
SECTION B-B'

2 / D-5 CROSS WEIR
Not To Scale



NOTES:

1. PLACE TYPE 1 ROCK RIP-RAP IN SUCCESSIVE LIFTS, BACKFILL VOIDS IN TYPE 1 ROCK RIP-RAP WITH STREAMBED FILL IN EACH SUCCESSIVE.

3 / D-5 BURIED GROIN
Not To Scale

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GUADALUPE CREEK
RESTORATION PROJECT
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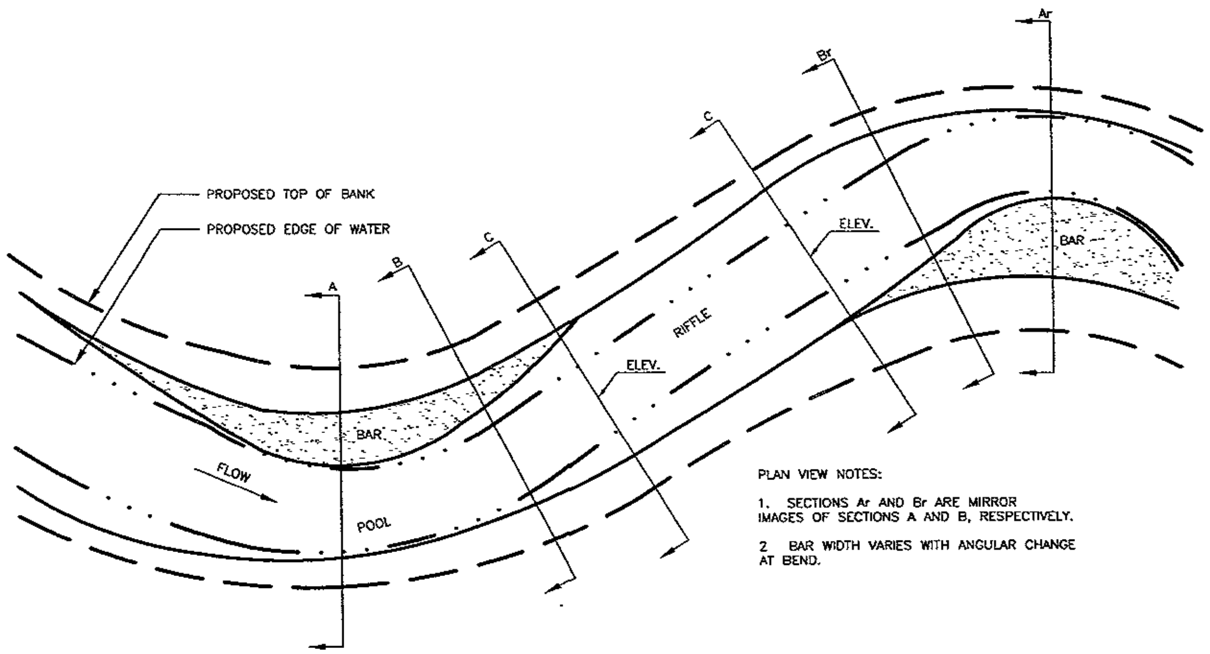
SCALE AS SHOWN
SHEET
D-5
42 OF 47



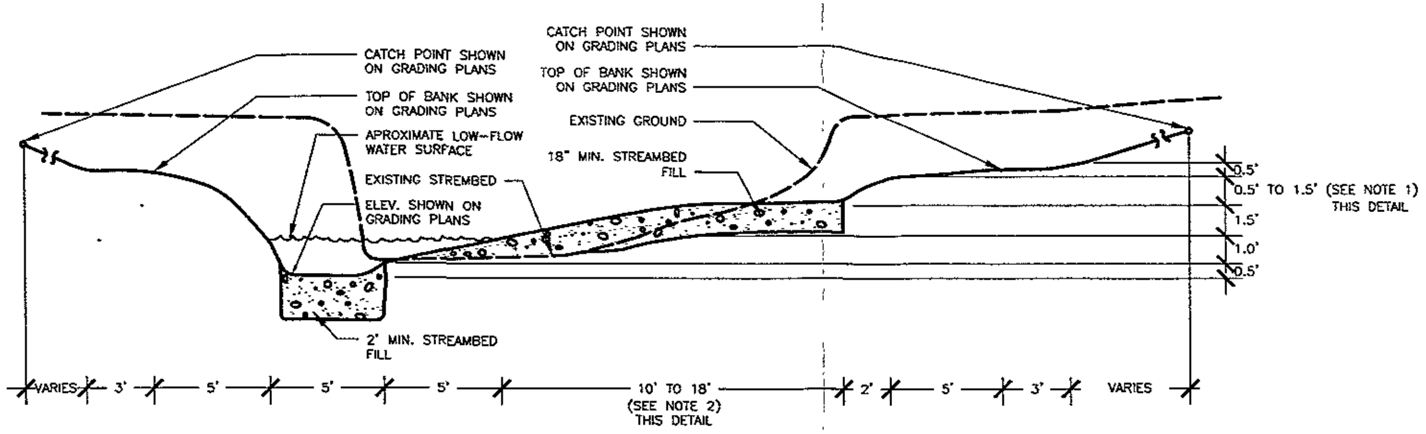
PLAN VIEW NOTES:

1. SECTIONS Ar AND Br ARE MIRROR IMAGES OF SECTIONS A AND B, RESPECTIVELY.

2. BAR WIDTH VARIES WITH ANGULAR CHANGE AT BEND.

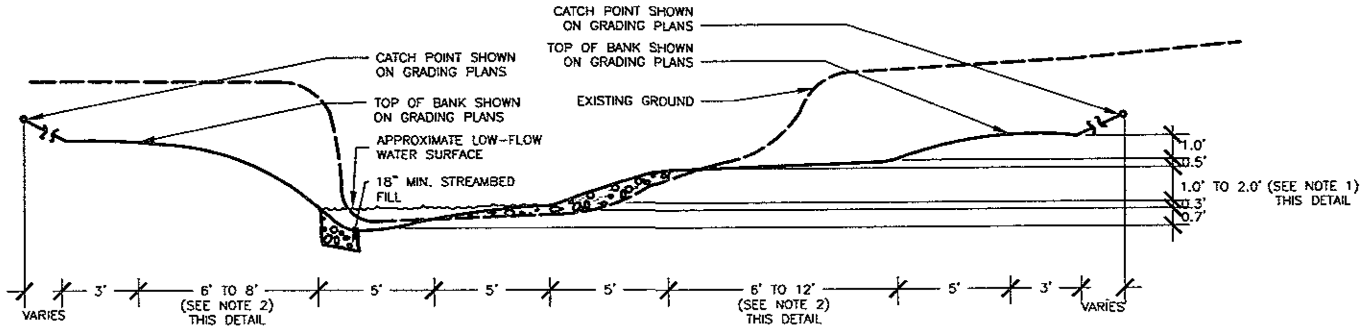
1 D-6 CHANNEL REALIGNMENT - TYPICAL SECTION LOCATIONS

Not To Scale


CATCH POINT SHOWN ON GRADING PLANS
TOP OF BANK SHOWN ON GRADING PLANS
APROXIMATE LOW-FLOW WATER SURFACE
EXISTING STREMBED
ELEV. SHOWN ON GRADING PLANS
2' MIN. STREAMBED FILL
CATCH POINT SHOWN ON GRADING PLANS
TOP OF BANK SHOWN ON GRADING PLANS
EXISTING GROUND
18" MIN. STREAMBED FILL
0.5'
0.5' TO 1.5' (SEE NOTE 1) THIS DETAIL
1.5'
1.0'
0.5'
VARIES
3'
5'
5'
5'
10' TO 18' (SEE NOTE 2) THIS DETAIL
2'
5'
3'
VARIES

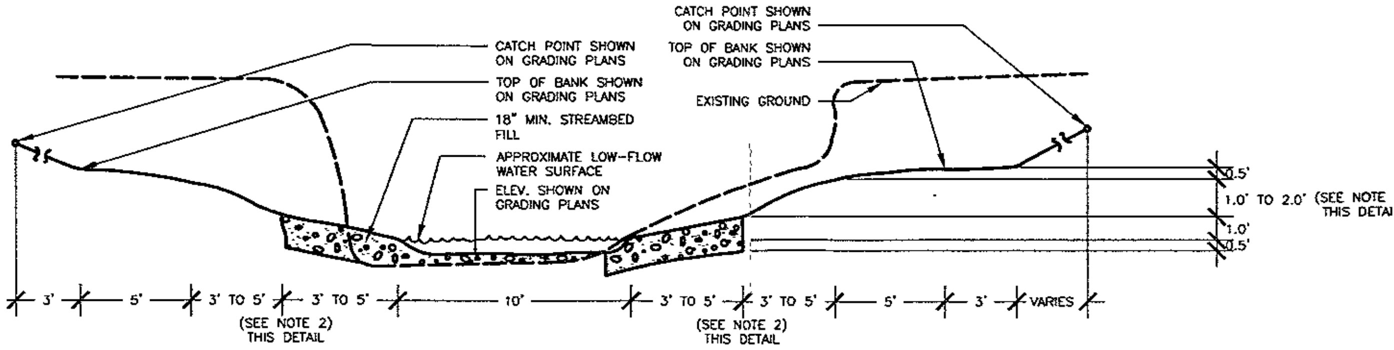
SECTION A (LOOKING UPSTREAM)

Not To Scale


CATCH POINT SHOWN ON GRADING PLANS
TOP OF BANK SHOWN ON GRADING PLANS
APPROXIMATE LOW-FLOW WATER SURFACE
18" MIN. STREAMBED FILL
CATCH POINT SHOWN ON GRADING PLANS
TOP OF BANK SHOWN ON GRADING PLANS
EXISTING GROUND
1.0'
0.5'
1.0' TO 2.0' (SEE NOTE 1) THIS DETAIL
0.3'
0.7'
VARIES
3'
6' TO 8' (SEE NOTE 2) THIS DETAIL
5'
5'
5'
6' TO 12' (SEE NOTE 2) THIS DETAIL
5'
3'
VARIES

SECTION B (LOOKING UPSTREAM)

Not To Scale


CATCH POINT SHOWN ON GRADING PLANS
TOP OF BANK SHOWN ON GRADING PLANS
18" MIN. STREAMBED FILL
APPROXIMATE LOW-FLOW WATER SURFACE
ELEV. SHOWN ON GRADING PLANS
CATCH POINT SHOWN ON GRADING PLANS
TOP OF BANK SHOWN ON GRADING PLANS
EXISTING GROUND
0.5'
1.0' TO 2.0' (SEE NOTE 1) THIS DETAIL
1.0'
0.5'
3'
5'
3' TO 5'
3' TO 5'
(SEE NOTE 2) THIS DETAIL
10'
3' TO 5'
3' TO 5'
(SEE NOTE 2) THIS DETAIL
5'
3'
VARIES

SECTION C (LOOKING UPSTREAM)

Not To Scale

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GUADALUPE CREEK
RESTORATION PROJECT
CHANNEL REALIGNMENT DETAILS

VERIFY SCALES
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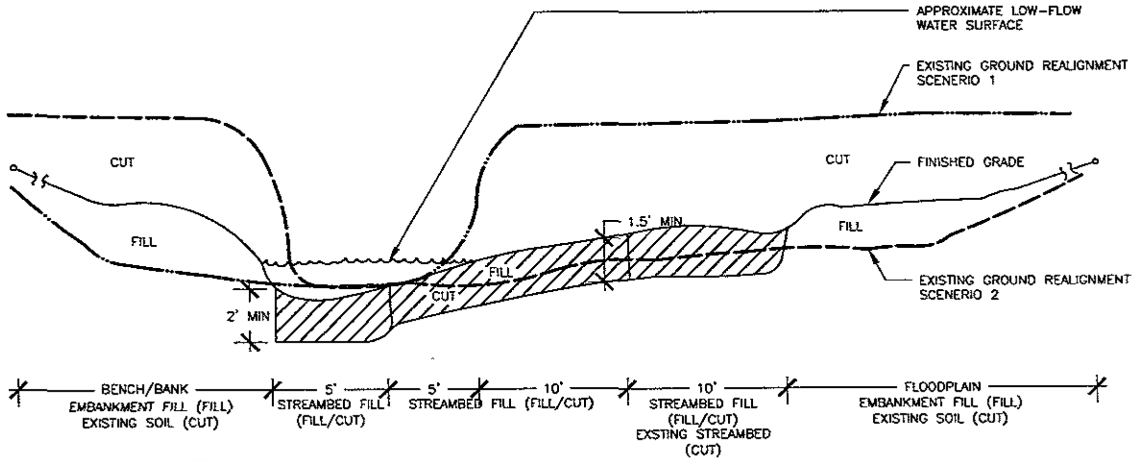
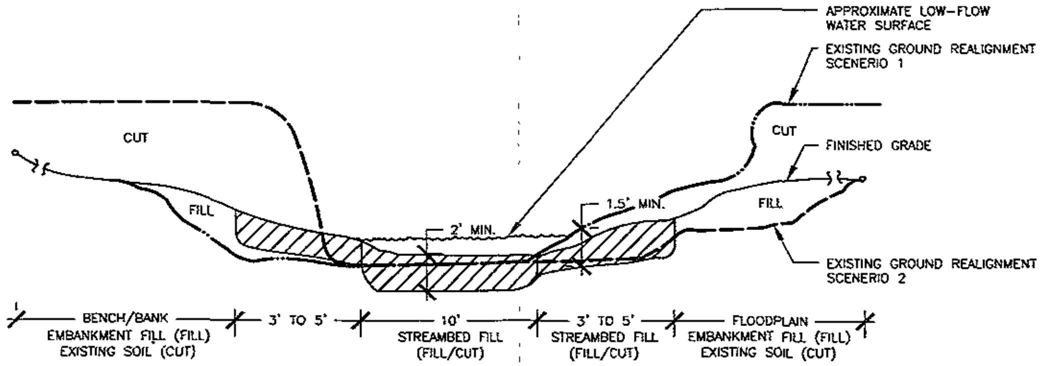
SCALE AS SHOWN

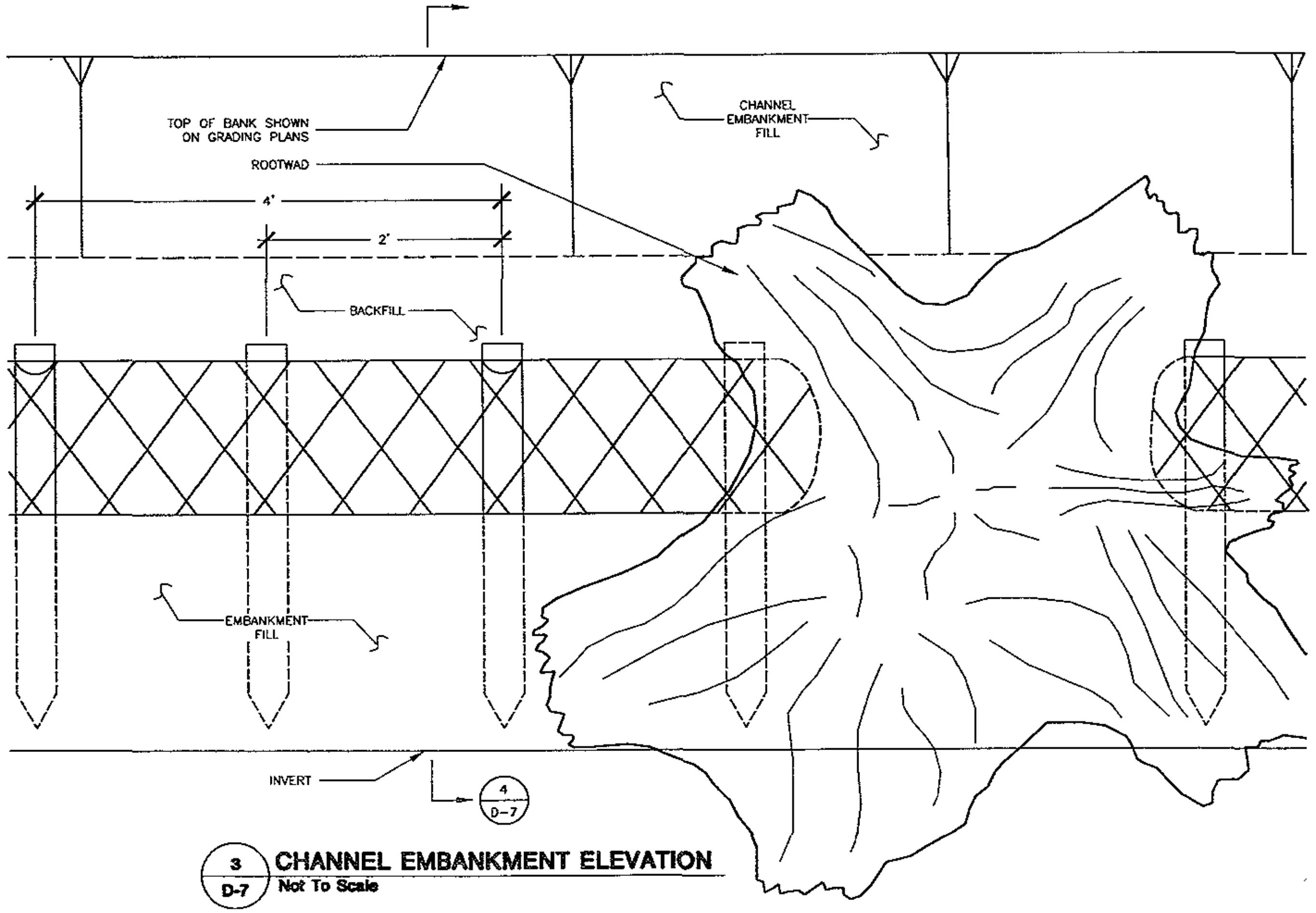
SHEET
D-6
43 OF 47


APPROXIMATE LOW-FLOW WATER SURFACE
EXISTING GROUND REALIGNMENT SCENERIO 1
CUT
CUT
FINISHED GRADE
FILL
FILL
1.5' MIN
FILL
CUT
2' MIN
EXISTING GROUND REALIGNMENT SCENERIO 2
BENCH/BANK EMBANKMENT FILL (FILL) EXISTING SOIL (CUT)
5' STREAMBED FILL (FILL/CUT)
5' STREAMBED FILL (FILL/CUT)
10'
10' STREAMBED FILL (FILL/CUT) EXSTING STREAMBED (CUT)
FLOODPLAIN EMBANKMENT FILL (FILL) EXISTING SOIL (CUT)

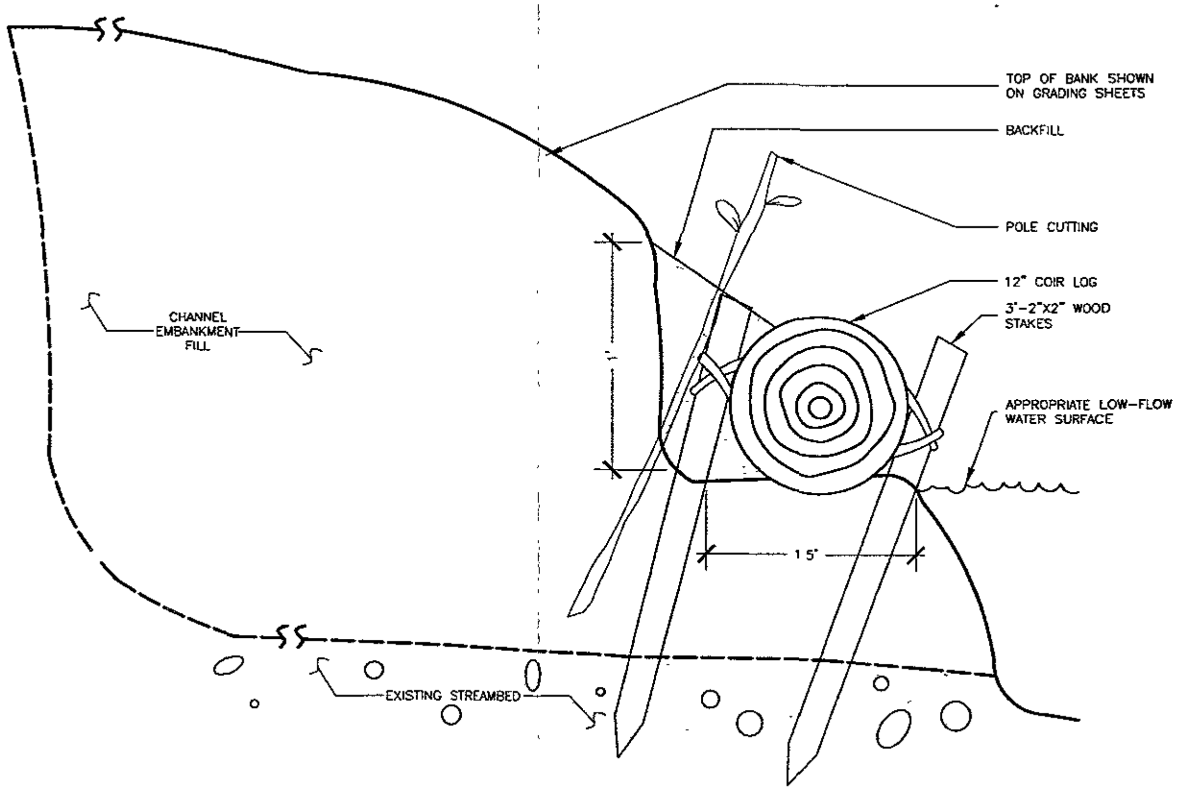
1 / D-7 CHANNEL REALIGNMENT MATERIALS SCHEMATIC SECTION A
Not To Scale


APPROXIMATE LOW-FLOW WATER SURFACE
EXISTING GROUND REALIGNMENT SCENERIO 1
CUT
CUT
FINISHED GRADE
FILL
FILL
1.5' MIN.
2' MIN.
EXISTING GROUND REALIGNMENT SCENERIO 2
BENCH/BANK EMBANKMENT FILL (FILL) EXISTING SOIL (CUT)
3' TO 5'
10' STREAMBED FILL (FILL/CUT)
3' TO 5' STREAMBED FILL (FILL/CUT)
FLOODPLAIN EMBANKMENT FILL (FILL) EXISTING SOIL (CUT)

2 / D-7 CHANNEL REALIGNMENT MATERIALS SCHEMATIC SECTION C
Not To Scale



3 / D-7 CHANNEL EMBANKMENT ELEVATION
Not To Scale



4 / D-7 CHANNEL EMBANKMENT CONSTRUCTION
Not To Scale

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GUADALUPE CREEK
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CHANNEL REALIGNMENT DETAILS

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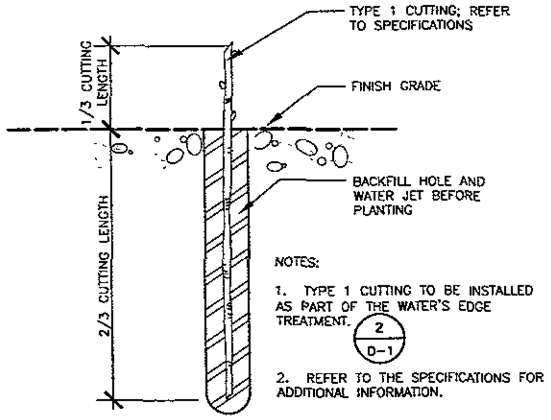
SCALE
AS SHOWN
SHEET
D-7
44 OF 47


TYPE 1 CUTTING; REFER TO SPECIFICATIONS
FINISH GRADE
1/3 CUTTING LENGTH
2/3 CUTTING LENGTH
BACKFILL HOLE AND WATER JET BEFORE PLANTING

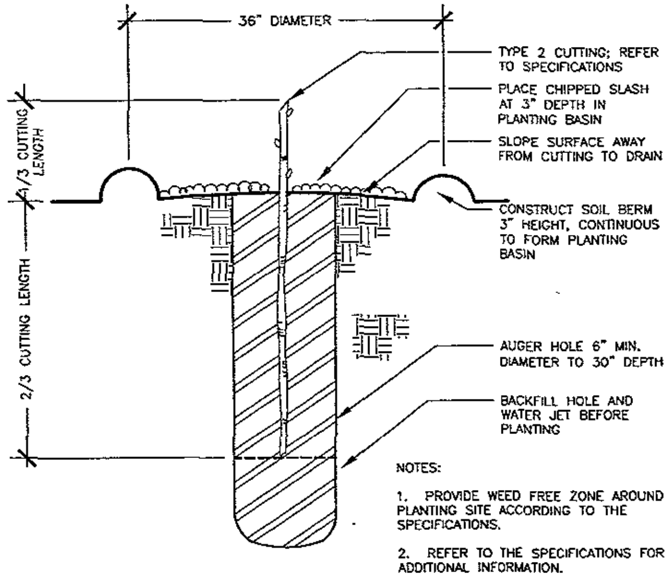
NOTES:

1. TYPE 1 CUTTING TO BE INSTALLED AS PART OF THE WATER'S EDGE TREATMENT. (2 / D-1)

2. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

1 / D-8 TYPE 1 CUTTING

Not To Scale


36" DIAMETER
TYPE 2 CUTTING; REFER TO SPECIFICATIONS
PLACE CHIPPED SLASH AT 3" DEPTH IN PLANTING BASIN
SLOPE SURFACE AWAY FROM CUTTING TO DRAIN
CONSTRUCT SOIL BERM 3" HEIGHT, CONTINUOUS TO FORM PLANTING BASIN
1/3 CUTTING LENGTH
2/3 CUTTING LENGTH
AUGER HOLE 6" MIN. DIAMETER TO 30" DEPTH
BACKFILL HOLE AND WATER JET BEFORE PLANTING

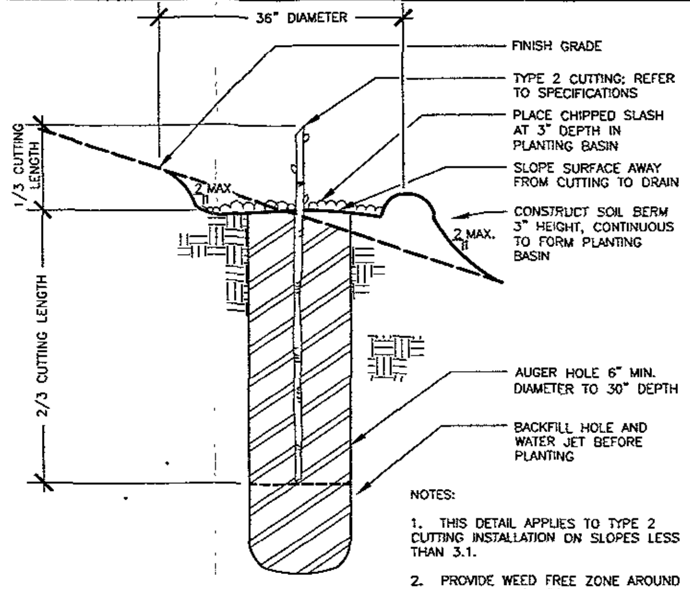
NOTES:

1. PROVIDE WEED FREE ZONE AROUND PLANTING SITE ACCORDING TO THE SPECIFICATIONS.

2. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

2 / D-8 TYPE 2 CUTTING ON BENCH

Not To Scale


36" DIAMETER
FINISH GRADE
TYPE 2 CUTTING; REFER TO SPECIFICATIONS
PLACE CHIPPED SLASH AT 3" DEPTH IN PLANTING BASIN
SLOPE SURFACE AWAY FROM CUTTING TO DRAIN
CONSTRUCT SOIL BERM 3" HEIGHT, CONTINUOUS TO FORM PLANTING BASIN
2 MAX.
1
2 MAX.
1
1/3 CUTTING LENGTH
2/3 CUTTING LENGTH
AUGER HOLE 6" MIN. DIAMETER TO 30" DEPTH
BACKFILL HOLE AND WATER JET BEFORE PLANTING

NOTES:

1. THIS DETAIL APPLIES TO TYPE 2 CUTTING INSTALLATION ON SLOPES LESS THAN 3:1.

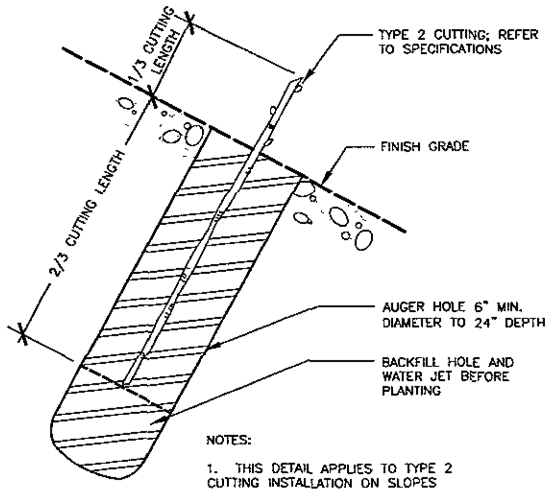
2. PROVIDE WEED FREE ZONE AROUND PLANTING SITE ACCORDING TO THE SPECIFICATIONS.

3. SOIL BERM SLOPE WILL BE NO GREATER THAN 2:1 HORIZONTAL TO VERTICAL.

4. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

3 / D-8 TYPE 2 CUTTING ON SLOPE

Not To Scale


1/3 CUTTING LENGTH
2/3 CUTTING LENGTH
TYPE 2 CUTTING; REFER TO SPECIFICATIONS
FINISH GRADE
AUGER HOLE 6" MIN. DIAMETER TO 24" DEPTH
BACKFILL HOLE AND WATER JET BEFORE PLANTING

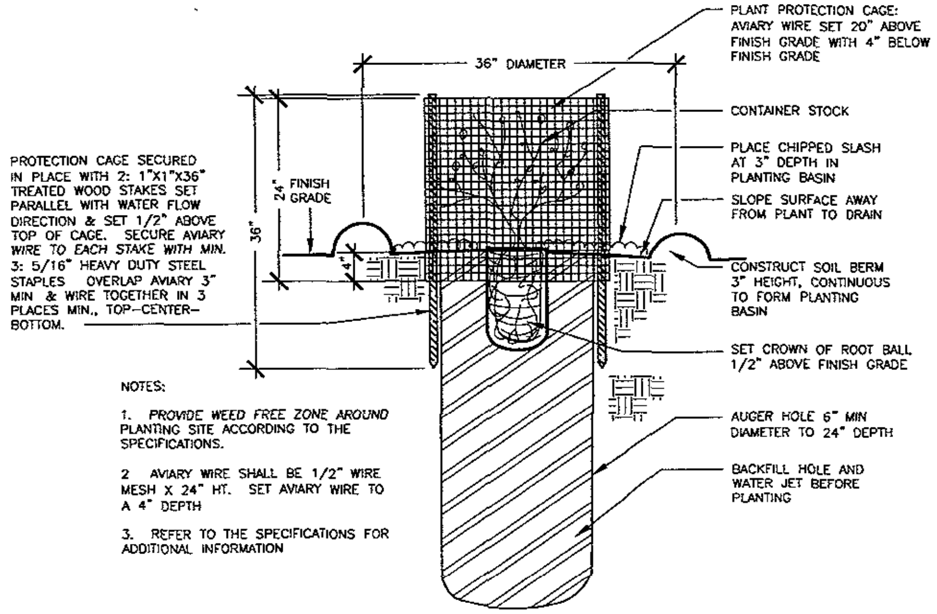
NOTES:

1. THIS DETAIL APPLIES TO TYPE 2 CUTTING INSTALLATION ON SLOPES GREATER THAN OR EQUAL TO 3:1.

2. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

4 / D-8 TYPE 2 CUTTING ON BANK

Not To Scale


PLANT PROTECTION CAGE: AVIARY WIRE SET 20" ABOVE FINISH GRADE WITH 4" BELOW FINISH GRADE
36" DIAMETER
CONTAINER STOCK
PLACE CHIPPED SLASH AT 3" DEPTH IN PLANTING BASIN
SLOPE SURFACE AWAY FROM PLANT TO DRAIN
CONSTRUCT SOIL BERM 3" HEIGHT, CONTINUOUS TO FORM PLANTING BASIN
SET CROWN OF ROOT BALL 1/2" ABOVE FINISH GRADE
AUGER HOLE 6" MIN DIAMETER TO 24" DEPTH
BACKFILL HOLE AND WATER JET BEFORE PLANTING
36"
24"
4"
FINISH GRADE
PROTECTION CAGE SECURED IN PLACE WITH 2: 1"X1"X36" TREATED WOOD STAKES SET PARALLEL WITH WATER FLOW DIRECTION & SET 1/2" ABOVE TOP OF CAGE. SECURE AVIARY WIRE TO EACH STAKE WITH MIN. 3: 5/16" HEAVY DUTY STEEL STAPLES OVERLAP AVIARY 3" MIN & WIRE TOGETHER IN 3 PLACES MIN., TOP–CENTER–BOTTOM.

NOTES:

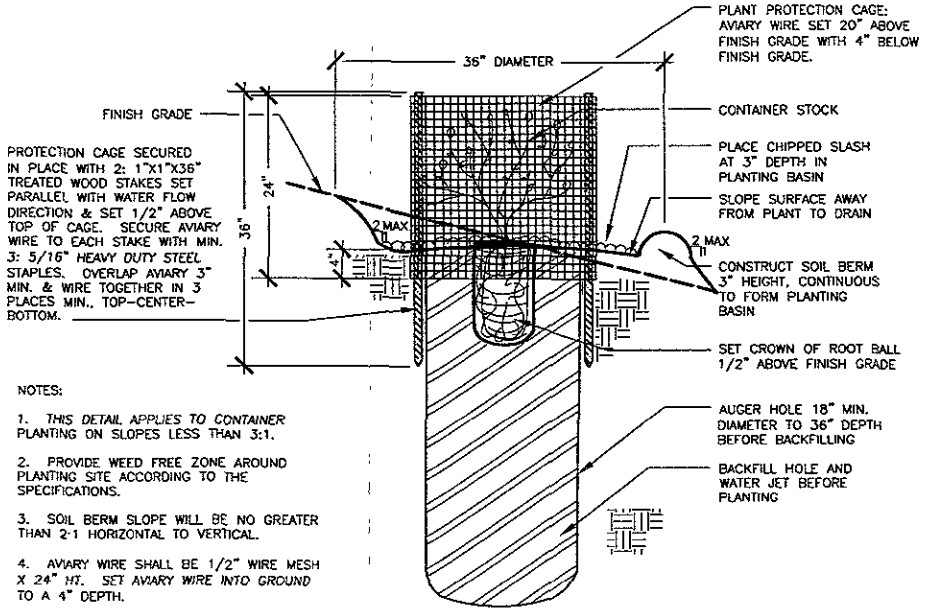
1. *PROVIDE WEED FREE ZONE AROUND* PLANTING SITE ACCORDING TO THE SPECIFICATIONS.

2 AVIARY WIRE SHALL BE 1/2" WIRE MESH X 24" HT. SET AVIARY WIRE TO A 4" DEPTH

3. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION

5 / D-8 CONTAINER PLANTING ON BENCH

Not To Scale


PLANT PROTECTION CAGE: AVIARY WIRE SET 20" ABOVE FINISH GRADE WITH 4" BELOW FINISH GRADE.
36" DIAMETER
FINISH GRADE
CONTAINER STOCK
PLACE CHIPPED SLASH AT 3" DEPTH IN PLANTING BASIN
SLOPE SURFACE AWAY FROM PLANT TO DRAIN
2 MAX
1
2 MAX
1
CONSTRUCT SOIL BERM 3" HEIGHT, CONTINUOUS TO FORM PLANTING BASIN
SET CROWN OF ROOT BALL 1/2" ABOVE FINISH GRADE
AUGER HOLE 18" MIN. DIAMETER TO 36" DEPTH BEFORE BACKFILLING
BACKFILL HOLE AND WATER JET BEFORE PLANTING
36"
24"
4"
PROTECTION CAGE SECURED IN PLACE WITH 2: 1"X1"X36" TREATED WOOD STAKES SET PARALLEL WITH WATER FLOW DIRECTION & SET 1/2" ABOVE TOP OF CAGE. SECURE AVIARY WIRE TO EACH STAKE WITH MIN. 3: 5/16" HEAVY DUTY STEEL STAPLES. OVERLAP AVIARY 3" MIN. & WIRE TOGETHER IN 3 PLACES MIN., TOP–CENTER–BOTTOM.

NOTES:

1. *THIS DETAIL APPLIES TO CONTAINER* PLANTING ON SLOPES LESS THAN 3:1.

2. PROVIDE WEED FREE ZONE AROUND PLANTING SITE ACCORDING TO THE SPECIFICATIONS.

3. SOIL BERM SLOPE WILL BE NO GREATER THAN 2:1 HORIZONTAL TO VERTICAL.

4. AVIARY WIRE SHALL BE 1/2" WIRE MESH *X 24" HT. SET AVIARY WIRE INTO GROUND* TO A 4" DEPTH.

5. SET CAGE AND STAKES VERTICAL. FIELD ADJUST HEIGHT AS NECESSARY TO ACCOMMODATE SLOPES ACCORDING TO THE ENGINEER'S DIRECTION.

6. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION

6 / D-8 CONTAINER PLANTING ON SLOPE

Not To Scale

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GUADALUPE CREEK
RESTORATION PROJECT

PLANTING DETAILS

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0 1"
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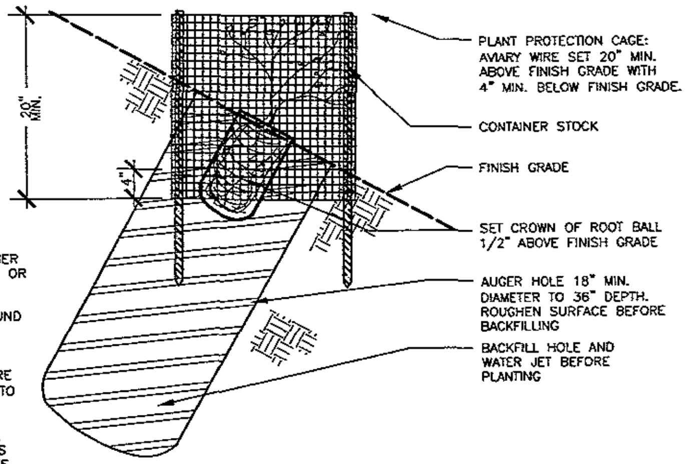
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE
AS SHOWN

SHEET
D-8
45 OF 47


PROTECTION CAGE SECURED IN PLACE WITH 2: 1"X1"X36" TREATED WOOD STAKES SET PARALLEL WITH WATER FLOW DIRECTION & SET 1/2" ABOVE TOP OF CAGE. SECURE AVIARY WIRE TO EACH STAKE WITH MIN. 3: 5/16" HEAVY DUTY STEEL STAPLES. OVERLAP AVIARY 3" MIN. & WIRE TOGETHER IN 3 PLACES MIN., TOP-CENTER-BOTTOM
20" MIN.
4"
PLANT PROTECTION CAGE: AVIARY WIRE SET 20" MIN. ABOVE FINISH GRADE WITH 4" MIN. BELOW FINISH GRADE.
CONTAINER STOCK
FINISH GRADE
SET CROWN OF ROOT BALL 1/2" ABOVE FINISH GRADE
AUGER HOLE 18" MIN. DIAMETER TO 36" DEPTH. ROUGHEN SURFACE BEFORE BACKFILLING
BACKFILL HOLE AND WATER JET BEFORE PLANTING

NOTES:

1. THIS DETAIL APPLIES TO CONTAINER PLANTING ON SLOPES GREATER THAN OR EQUAL TO 3:1.

2. PROVIDE WEED FREE ZONE AROUND *PLANTING SITE ACCORDING TO THE* SPECIFICATIONS.

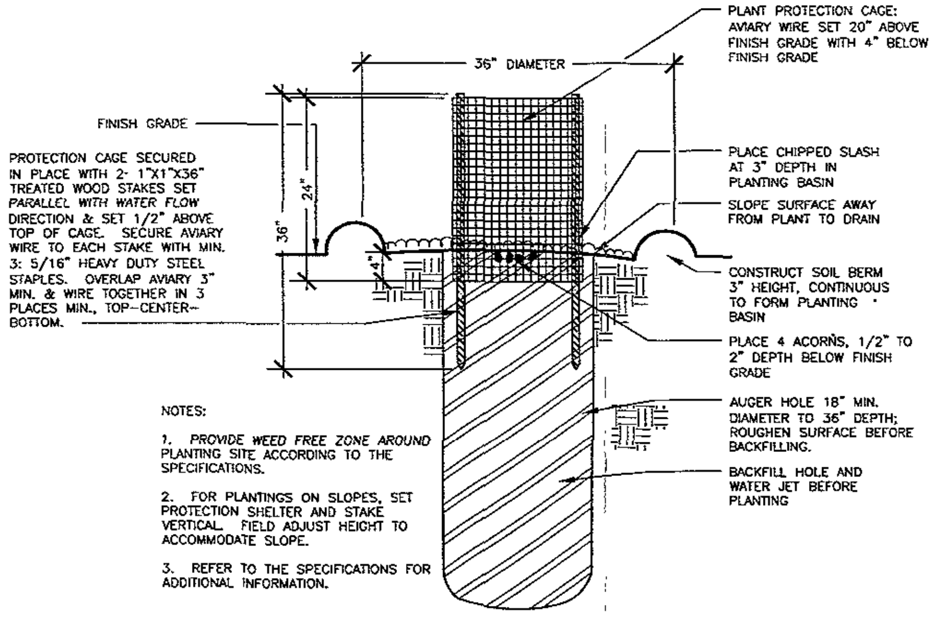
3. AVIARY WIRE SHALL BE 1/2" WIRE MESH X 24" HT. SET AVIARY WIRE TO A 4" DEPTH.

4. SET CAGE AND STAKES VERTICAL TO SLOPE. FIELD ADJUST HEIGHT AS NECESSARY TO ACCOMMODATE SLOPES ACCORDING TO THE ENGINEER'S DIRECTION.

5. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

1/D-9 CONTAINER PLANTING ON BANK

Not To Scale


PLANT PROTECTION CAGE: AVIARY WIRE SET 20" ABOVE FINISH GRADE WITH 4" BELOW FINISH GRADE
36" DIAMETER
FINISH GRADE
PROTECTION CAGE SECURED IN PLACE WITH 2- 1"X1"X36" TREATED WOOD STAKES SET *PARALLEL WITH WATER FLOW* DIRECTION & SET 1/2" ABOVE TOP OF CAGE. SECURE AVIARY WIRE TO EACH STAKE WITH MIN. 3: 5/16" HEAVY DUTY STEEL STAPLES. OVERLAP AVIARY 3" MIN. & WIRE TOGETHER IN 3 PLACES MIN., TOP-CENTER-BOTTOM.
36"
24"
4"
PLACE CHIPPED SLASH AT 3" DEPTH IN PLANTING BASIN
SLOPE SURFACE AWAY FROM PLANT TO DRAIN
CONSTRUCT SOIL BERM 3" HEIGHT, CONTINUOUS TO FORM PLANTING BASIN
PLACE 4 ACORNS, 1/2" TO 2" DEPTH BELOW FINISH GRADE
AUGER HOLE 18" MIN. DIAMETER TO 36" DEPTH; ROUGHEN SURFACE BEFORE BACKFILLING.
BACKFILL HOLE AND WATER JET BEFORE PLANTING

NOTES:

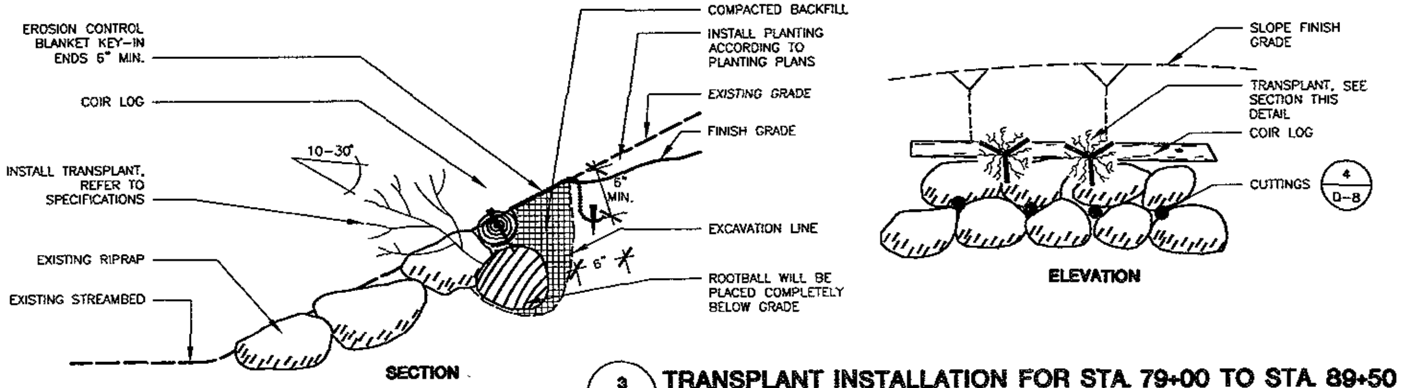
1. *PROVIDE WEED FREE ZONE AROUND* PLANTING SITE ACCORDING TO THE SPECIFICATIONS.

2. FOR PLANTINGS ON SLOPES, SET PROTECTION SHELTER AND STAKE VERTICAL. FIELD ADJUST HEIGHT TO ACCOMMODATE SLOPE.

3. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

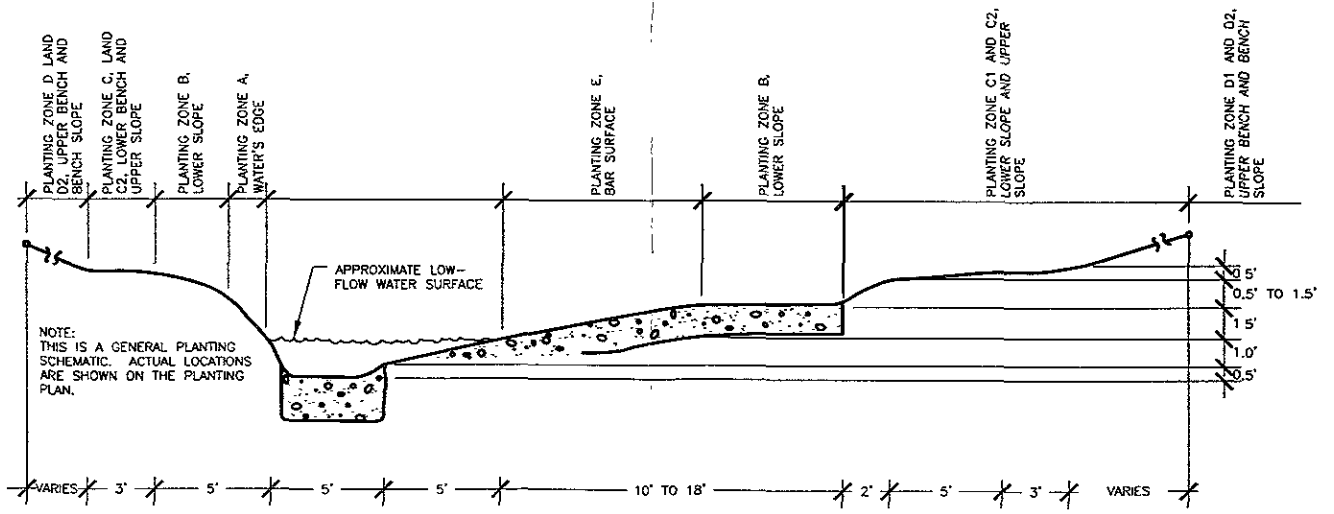
2/D-9 ACORN PLANTING

Not To Scale


EROSION CONTROL BLANKET KEY-IN ENDS 6" MIN.
COIR LOG
INSTALL TRANSPLANT, REFER TO SPECIFICATIONS
10-30°
EXISTING RIPRAP
EXISTING STREAMBED
COMPACTED BACKFILL
INSTALL PLANTING ACCORDING TO PLANTING PLANS
EXISTING GRADE
FINISH GRADE
6" MIN.
EXCAVATION LINE
6"
ROOTBALL WILL BE PLACED COMPLETELY BELOW GRADE
SECTION
SLOPE FINISH GRADE
TRANSPLANT, SEE SECTION THIS DETAIL
COIR LOG
CUTTINGS 4/D-8
ELEVATION

3/D-9 TRANSPLANT INSTALLATION FOR STA 79+00 TO STA 89+50

Not To Scale


PLANTING ZONE D LAND D2, UPPER BENCH AND BENCH SLOPE
PLANTING ZONE C, LAND C2, LOWER BENCH AND UPPER SLOPE
PLANTING ZONE B, LOWER SLOPE
PLANTING ZONE A, WATER'S EDGE
PLANTING ZONE E, BAR SURFACE
PLANTING ZONE B, LOWER SLOPE
PLANTING ZONE C1 AND C2, *LOWER SLOPE AND UPPER* SLOPE
PLANTING ZONE D1 AND D2, *UPPER BENCH AND BENCH* SLOPE
APPROXIMATE LOW-FLOW WATER SURFACE
0.5'
0.5' TO 1.5'
1.5'
1.0'
0.5'
VARIES
3'
5'
5'
5'
10' TO 18'
2'
5'
3'
VARIES

NOTE:
THIS IS A GENERAL PLANTING SCHEMATIC. ACTUAL LOCATIONS ARE SHOWN ON THE PLANTING PLAN.

4/D-9 PLANTING ZONES

Not To Scale **SECTION LOOKING UPSTREAM**

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

Jones & Stokes
2880 Zanker Rd., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard, suite 100c
west sacramento, california 95691-3430

CONSULTANT STAMP

CONSULTANT STAMP

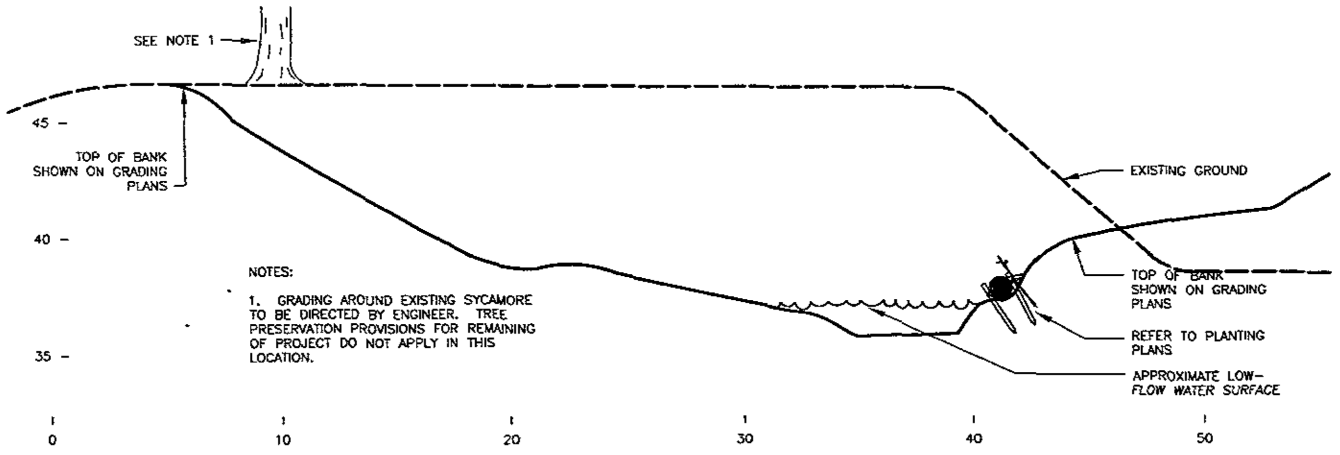
DATE 7/17/00
DESIGN A.R./E.W.
DRAWN S.A.B
CHECKED E.W./J.Z.

Santa Clara Valley Water District
ACCEPTED BY DISTRICT
DATE

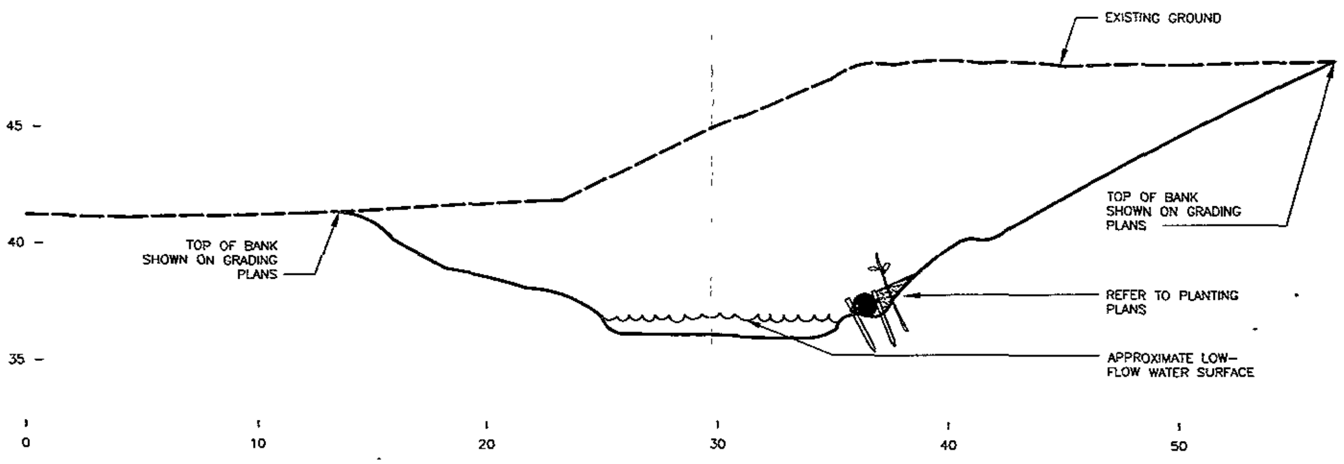
GUADALUPE CREEK
RESTORATION PROJECT
PLANTING DETAILS

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

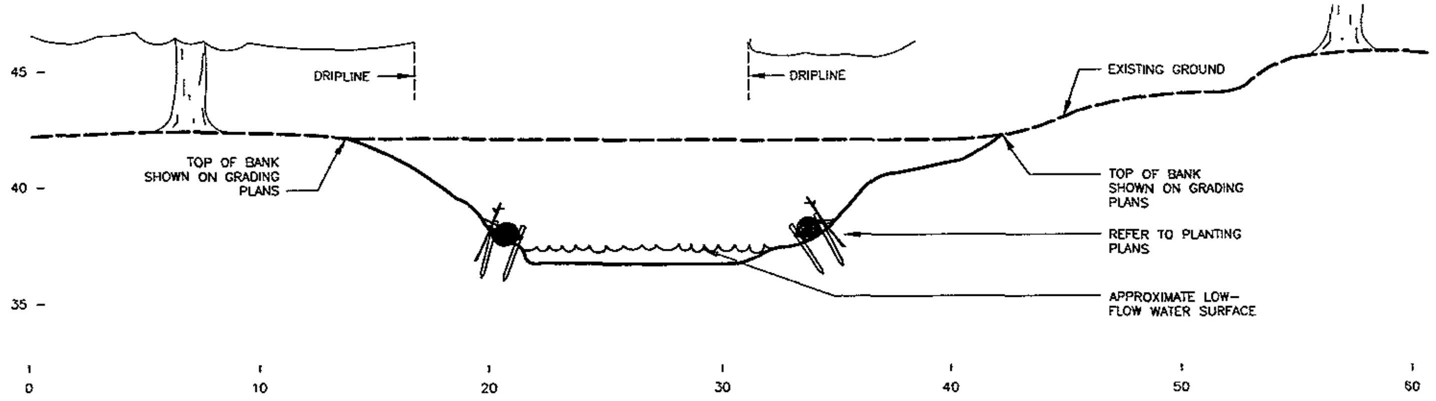
SCALE AS SHOWN
SHEET
D-9
45 OF 47


SEE NOTE 1
45
40
35
TOP OF BANK SHOWN ON GRADING PLANS
NOTES:
1. GRADING AROUND EXISTING SYCAMORE TO BE DIRECTED BY ENGINEER. TREE PRESERVATION PROVISIONS FOR REMAINING OF PROJECT DO NOT APPLY IN THIS LOCATION.
EXISTING GROUND
TOP OF BANK SHOWN ON GRADING PLANS
REFER TO PLANTING PLANS
APPROXIMATE LOW-FLOW WATER SURFACE
0
10
20
30
40
50

1 XS-1 **STATION 71+96**
Not To Scale


EXISTING GROUND
45
40
35
TOP OF BANK SHOWN ON GRADING PLANS
TOP OF BANK SHOWN ON GRADING PLANS
REFER TO PLANTING PLANS
APPROXIMATE LOW-FLOW WATER SURFACE
0
10
20
30
40
50

2 XS-1 **STATION 72+94**
Not To Scale


45
40
35
DRIPLINE
DRIPLINE
EXISTING GROUND
TOP OF BANK SHOWN ON GRADING PLANS
TOP OF BANK SHOWN ON GRADING PLANS
REFER TO PLANTING PLANS
APPROXIMATE LOW-FLOW WATER SURFACE
0
10
20
30
40
50
60

3 XS-1 **STATION 73+38**
Not To Scale

REV	DESCRIPTION	DATE	APPR
	DRAFT SUBMITTAL NOT FOR CONSTRUCTION		

Jones & Stokes
2880 Zanker Rd., San Jose, CA 95134

nhc
northwest hydraulic consultants, inc.
3950 industrial boulevard suite 100c
west sacramento, california 95691-3430

CONSULTANT STAMP

CONSULTANT STAMP

DATE
7/17/00
DESIGN
A.R./E.W.
DRAWN
S.A.B
CHECKED
E.W./J.Z.

Santa Clara Valley Water District
ACCEPTED BY DISTRICT
DATE

GUADALUPE CREEK
RESTORATION PROJECT
CROSS SECTIONS

VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SCALE
AS SHOWN
SHEET
XS-1
47 OF 47

This cost estimate is a planning tool to assess the level of effort required to perform the work. This estimate is preliminary, and actual costs may vary by an order of magnitude. Actual construction costs may vary from the above estimates because of competitive bidding, negotiations with the Santa Clara Valley Water District, or fluctuations in market prices. This estimate is not a bid.

Total costs have been rounded off for order-of-magnitude purposes.

This estimate does not include contingencies for soil disposal and soil management relating to hazardous materials that may be found onsite. Based on existing data, this estimate assumes that 40% of the material will be disposed of at a Class II or Class III facility.

This estimate assumes that the District will be responsible for control of water, including dewatering the creek and rerouting flows through the Los Capitancillos percolation pond system.

Appendix D. Cost Estimates for Project Alternatives and Recommended Project

Construction Cost Estimate for the Recommended Project

Item No.	Description of Bid Item	Approximate Quantity	Unit	Unit Price	Total
1	Storm Water Pollution Prevention Plan	1	Lump Sum	$50,000.00	$50,000
2	Mobilization /Demobilization	1	Lump Sum	$130,000.00	$130,000
3	Preservation Fencing	20,000	Linear Foot	$5.00	$100,000
4	Individual Plant Removal	1	Lump Sum	$30,000.00	$30,000
5	Cluster Plant Removal	91,000	Square Foot	$0.50	$45,500
6	Existing Tree Excavation for Transplanting	152	Each	$850.00	$129,200
7	Existing Tree Excavation for Reuse as Instream Woody Material	2	Each	$1,000.00	$2,000
8	Asphaltic Concrete Removal	1	Lump Sum	$3,000.00	$3,000
9	Existing Concrete Slope Protection Removal	24	Ton	$100.00	$2,400
10	Control of Water (Coordination with District)	1	Lump Sum	$15,000.00	$15,000
11	Channel Excavation	17,000	Ton	$6.00	$102,000
12	Bank and Bench Excavation	71,000	Ton	$3.00	$213,000
13	Instream Structure Excavation	7,000	Ton	$9.00	$63,000
14	Type 3 Boulder Removal and Salvage	200	Each	$30.00	$6,000
15	Soil Disposal	46,200	Ton	$16.50	$762,300
16	Toxic Constituent Disposal	38,000	Ton	$65.00	$2,470,000
17	Soil Loosening	300,000	Square Foot	$0.04	$12,000
18	Channel Embankment Construction	5,000	Ton	$30.00	$150,000
19	Bench Construction	3,700	Ton	$35.00	$129,500
20	Streambed Construction	7,300	Ton	$36.00	$262,800
21	Bar Construction	5,000	Square Foot	$3.00	$15,000
22	Topsoil Fill	6,000	Ton	$18.00	$108,000
23	Bank Protection	750	Linear Foot	$270.00	$202,500
24	Rock Slope Protection	100	Ton	$45.00	$4,500
25	Percolation Pond Construction	1	Lump Sum	$250,000.00	$250,000
26	Infrastructure Modifications	1	Lump Sum	$50,000.00	$50,000
27	Stream Boulder Placement	150	Each	$35.00	$5,250
28	Cross Weir	15	Each	$5,000.00	$75,000

29	V-Weirs	10	Each	$4,500.00	$45,000
30	Wing Deflector	4	Each	$1,500.00	$6,000
31	Log Stream Barb	30	Each	$1,400.00	$42,000
32	Rock Stream Barbs	24	Each	$2,200.00	$52,800
33	Waters Edge Treatment	3,000	Linear Foot	$20.00	$60,000
34	Buried Groins	335	Ton	$75.00	$25,125
35	Rootwad Bank Structure - Type 1	71	Each	$2,800.00	$198,800
36	Rootwad Bank Structure - Type 2	9	Each	$2,700.00	$24,300
37	Bar IWM	150	Each	$850.00	$127,500
38	Stream IWM	9	Each	$800.00	$7,200
39	Overbank Woody Material	12	Each	$2,300.00	$27,600
40	Log Toe Bank Structure	18	Each	$2,000.00	$36,000
41	Off-bank Branch Cover	45	Each	$800.00	$36,000
42	Off-bank Log Cover	8	Each	$800.00	$6,400
43	Remove, Salvage, and Reinstall Chain Link Fence	800	Linear Foot	$20.00	$16,000
44	Chain Link Fence	120	Linear Foot	$25.00	$3,000
45	Water Service Point	2	Each	$20,000.00	$40,000
46	Meter	2	Each	$5,000.00	$10,000
47	Backflow Assembly	2	Each	$8,000.00	$16,000
48	Main Line	18,000	Linear Foot	$12.00	$216,000
49	Bubbler Irrigation System	300,000	Square Foot	$1.50	$450,000
50	Supplemental Watering (Construction Period)	4	Per Event	$5,000.00	$20,000
51	Type 1 Cutting Collection and Storage	3,715	Each	$5.00	$18,575
52	Type 2 Cutting Collection and Storage	2,023	Each	$5.00	$10,115
53	Type 1 Cutting Installation	3,715	Each	$12.00	$44,580
54	Type 2 Cutting Installation on Bench	445	Each	$15.00	$6,675
55	Type 2 Cutting Installation on Slope	772	Each	$15.00	$11,580
56	Type 2 Cutting Installation on Bank	806	Each	$12.00	$9,672
57	Brush Layer Collection and Storage	100	Each	$20.00	$2,000
58	Brush Layer Installation	100	Each	$50.00	$5,000

59	Willow Wattles (20-foot lengths)	20	Each	$2,500.00	$50,000
60	Container Plant Installation on Bench	5,122	Each	$15.00	$76,830
61	Container Plant Installation on Slope	3,895	Each	$15.00	$58,425
62	Container Plant Installation on Bank	1,297	Each	$15.00	$19,455
63	Acorn Planting	206	Each	$12.00	$2,472
64	Transplanting	152	Each	$1,000.00	$152,000
65	Seeding	20	Acre	$2,000.00	$40,000
66	Weed Control (3-year Maintenance Period)	12	Month	$5,000.00	$60,000
67	Irrigation Operation (3-yearMaintenance Period)	21	Month	$1,200.00	$25,200
68	Supplemental Watering (3-yearMaintenance Period)	18	Per Event	$5,000.00	$90,000
69	Replacement Planting (3-yearMaintenance Period)	5500	Each	$25.00	$137,500
70	Reseeding (Maintenance Period)	275,000	Square Foot	$0.05	$13,750
71	Plant Establishment Forms	36	Each	$500.00	$18,000
72	Record Drawings	1	Set	$15,000.00	$15,000

Subtotal	$7,720,500
Quantity and Unit Cost Contingency	$772,050
Total Estimated Cost	**$8,492,550**

Notes:

This cost estimate is based on the Draft Submittal Construction Documents (i.e., plans & specifications) prepared by Jones & Stokes and Northwest Hydraulic Consultants, dated July 19, 2000, and conceptual changes developed for the recommended project based on comments received form District staff.

This cost estimate does not include subsequent phases of the project.

This cost estimate is a planning tool to assess the level of effort required to perform the work. This estimate is preliminary, and actual costs may vary by an order of magnitude. Actual construction costs may vary from the above estimates because of competitive bidding, negotiations with the Santa Clara Valley Water District, or fluctuations in market prices. This estimate is not a bid.

Total costs have been rounded off for order-of-magnitude purposes.

This estimate does not include contingencies for soil disposal and soil management relating to hazardous materials that may be found onsite. Based on existing data, this estimate assumes that 40% of the material will be disposed of at a Class II or Class III facility.

This estimate assumes that the District will be responsible for control of water, including dewatering the creek and rerouting flows through the Los Capitancillos percolation pond system.

Construction Cost Estimate for Alternative 1

Item No.	Description of Bid Item	Approximate Quantity	Unit	Unit Price	Total
1	Storm Water Pollution Prevention Plan	1	Lump Sum	$50,000.00	$50,000
2	Mobilization /Demobilization	1	Lump Sum	$104,000.00	$104,000
3	Preservation Fencing	20,000	Linear Foot	$5.00	$100,000
4	Individual Plant Removal	1	Lump Sum	$24,000.00	$19,200
5	Cluster Plant Removal	91,000	Square Foot	$0.50	$45,500
6	Existing Tree Excavation for Transplanting	122	Each	$850.00	$103,360
7	Existing Tree Excavation for Reuse as Instream Woody Material	2	Each	$1,000.00	$2,000
8	Asphaltic Concrete Removal	1	Lump Sum	$3,000.00	$3,000
9	Existing Concrete Slope Protection Removal	24	Ton	$100.00	$2,400
10	Control of Water (Coordination with District)	1	Lump Sum	$15,000.00	$15,000
11	Channel Excavation	12,750	Ton	$6.00	$76,500
12	Bank and Bench Excavation	53,250	Ton	$3.00	$159,750
13	Instream Structure Excavation	5,250	Ton	$9.00	$47,250
14	Type 3 Boulder Removal and Salvage	200	Each	$30.00	$6,000
15	Soil Disposal	34,650	Ton	$16.50	$571,725
16	Toxic Constituent Disposal	28,500	Ton	$65.00	$1,852,500
17	Soil Loosening	240,000	Square Foot	$0.04	$9,600
18	Channel Embankment Construction	3,750	Ton	$30.00	$112,500
19	Bench Construction	2,775	Ton	$35.00	$97,125
20	Streambed Construction	5,475	Ton	$36.00	$197,100
21	Bar Construction	3,750	Square Foot	$3.00	$11,250
22	Topsoil Fill	4,500	Ton	$18.00	$81,000
23	Bank Protection	1,095	Linear Foot	$270.00	$295,650
24	Rock Slope Protection	150	Ton	$45.00	$6,750
25	Percolation Pond Construction	1	Lump Sum	$250,000.00	$250,000
26	Infrastructure Modifications	1	Lump Sum	$50,000.00	$50,000
27	Stream Boulder Placement	150	Each	$35.00	$5,250
28	Cross Weir	15	Each	$5,000.00	$75,000

29	V-Weirs	10	Each	$4,500.00	$45,000
30	Wing Deflector	4	Each	$1,500.00	$6,000
31	Log Stream Barb	15	Each	$1,400.00	$21,000
32	Rock Stream Barbs	20	Each	$2,200.00	$44,000
33	Waters Edge Treatment	3,000	Linear Foot	$20.00	$60,000
34	Buried Groins	251	Ton	$75.00	$18,844
35	Rootwad Bank Structure - Type 1	36	Each	$2,800.00	$99,400
36	Rootwad Bank Structure - Type 2	9	Each	$2,700.00	$24,300
37	Bar IWM	125	Each	$850.00	$106,250
38	Stream IWM	9	Each	$800.00	$7,200
39	Overbank Woody Material	12	Each	$2,300.00	$27,600
40	Log Toe Bank Structure	18	Each	$2,000.00	$36,000
41	Off-bank Branch Cover	45	Each	$800.00	$36,000
42	Off-bank Log Cover	8	Each	$800.00	$6,400
43	Remove, Salvage, and Reinstall Chain Link Fence	800	Linear Foot	$20.00	$16,000
44	Chain Link Fence	120	Linear Foot	$25.00	$3,000
45	Water Service Point	2	Each	$20,000.00	$40,000
46	Meter	2	Each	$5,000.00	$10,000
47	Backflow Assembly	2	Each	$8,000.00	$16,000
48	Main Line	18,000	Linear Foot	$12.00	$216,000
49	Bubbler Irrigation System	200,000	Square Foot	$1.50	$300,000
50	Supplemental Watering (Construction Period)	4	Per Event	$5,000.00	$20,000
51	Type 1 Cutting Collection and Storage	2,601	Each	$5.00	$13,003
52	Type 2 Cutting Collection and Storage	1,416	Each	$5.00	$7,081
53	Type 1 Cutting Installation	2,601	Each	$12.00	$31,206
54	Type 2 Cutting Installation on Bench	312	Each	$15.00	$4,673
55	Type 2 Cutting Installation on Slope	540	Each	$15.00	$8,106
56	Type 2 Cutting Installation on Bank	564	Each	$12.00	$6,770
57	Brush Layer Collection and Storage	100	Each	$20.00	$2,000
58	Brush Layer Installation	100	Each	$50.00	$5,000

59	Willow Wattles (20-foot lengths)	20	Each	$2,500.00	$50,000
60	Container Plant Installation on Bench	3,585	Each	$15.00	$53,781
61	Container Plant Installation on Slope	2,727	Each	$15.00	$40,898
62	Container Plant Installation on Bank	908	Each	$15.00	$13,619
63	Acorn Planting	144	Each	$12.00	$1,730
64	Transplanting	122	Each	$1,000.00	$121,600
65	Seeding	20	Acre	$2,000.00	$40,000
66	Weed Control (3-year Maintenance Period)	12	Month	$5,000.00	$60,000
67	Irrigation Operation (3-yearMaintenance Period)	21	Month	$1,200.00	$25,200
68	Supplemental Watering (3-yearMaintenance Period)	18	Per Event	$3,500.00	$63,000
69	Replacement Planting (3-yearMaintenance Period)	3850	Each	$25.00	$96,250
70	Reseeding (Maintenance Period)	275,000	Square Foot	$0.05	$13,750
71	Plant Establishment Forms	36	Each	$500.00	$18,000
72	Record Drawings	1	Set	$15,000.00	$15,000
Subtotal					$6,199,100
Quantity and Unit Cost Contingency					$619,910
Total Estimated Cost					**$6,819,010**

Notes:

This cost estimate is based on the Draft Submittal Construction Documents (i.e., plans & specifications) prepared by Jones & Stokes and Northwest Hydraulic Consultants, dated July 19, 2000, and conceptual changes developed for the recommended project based on comments received form District staff.

This cost estimate does not include subsequent phases of the project.

This cost estimate is a planning tool to assess the level of effort required to perform the work. This estimate is preliminary, and actual costs may vary by an order of magnitude. Actual construction costs may vary from the above estimates because of competitive bidding, negotiations with the Santa Clara Valley Water District, or fluctuations in market prices. This estimate is not a bid.

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This estimate assumes that the District will be responsible for control of water, including dewatering the creek and rerouting flows through the Los Capitancillos percolation pond system.

Construction Cost Estimate for Alternative 2

Item No.	Description of Bid Item	Approximate Quantity	Unit	Unit Price	Total
1	Storm Water Pollution Prevention Plan	1	Lump Sum	$50,000.00	$50,000
2	Mobilization /Demobilization	1	Lump Sum	$78,000.00	$78,000
3	Preservation Fencing	20,000	Linear Foot	$5.00	$100,000
4	Individual Plant Removal	1	Lump Sum	$18,000.00	$14,400
5	Cluster Plant Removal	91,000	Square Foot	$0.50	$45,500
6	Existing Tree Excavation for Transplanting	91	Each	$850.00	$77,520
7	Existing Tree Excavation for Reuse as Instream Woody Material	2	Each	$1,000.00	$2,000
8	Asphaltic Concrete Removal	1	Lump Sum	$3,000.00	$3,000
9	Existing Concrete Slope Protection Removal	0	Ton	$100.00	$0
10	Control of Water (Coordination with District)	1	Lump Sum	$15,000.00	$15,000
11	Channel Excavation	6,800	Ton	$6.00	$40,800
12	Bank and Bench Excavation	28,400	Ton	$3.00	$85,200
13	Instream Structure Excavation	2,800	Ton	$9.00	$25,200
14	Type 3 Boulder Removal and Salvage	200	Each	$30.00	$6,000
15	Soil Disposal	18,480	Ton	$16.50	$304,920
16	Toxic Constituent Disposal	15,200	Ton	$65.00	$988,000
17	Soil Loosening	180,000	Square Foot	$0.04	$7,200
18	Channel Embankment Construction	2,000	Ton	$30.00	$60,000
19	Bench Construction	1,480	Ton	$35.00	$51,800
20	Streambed Construction	2,920	Ton	$36.00	$105,120
21	Bar Construction	2,000	Square Foot	$3.00	$6,000
22	Topsoil Fill	2,400	Ton	$18.00	$43,200
23	Bank Protection	1,285	Linear Foot	$270.00	$346,950
24	Rock Slope Protection	175	Ton	$45.00	$7,875
25	Percolation Pond Construction	0	Lump Sum	$250,000.00	$0
26	Infrastructure Modifications	0	Lump Sum	$50,000.00	$0
27	Stream Boulder Placement	150	Each	$35.00	$5,250
28	Cross Weir	18	Each	$5,000.00	$90,000

29	V-Weirs	10	Each	$4,500.00	$45,000
30	Wing Deflector	4	Each	$1,500.00	$6,000
31	Log Stream Barb	20	Each	$1,400.00	$28,000
32	Rock Stream Barbs	20	Each	$2,200.00	$44,000
33	Waters Edge Treatment	3,000	Linear Foot	$20.00	$60,000
34	Buried Groins	268	Ton	$75.00	$20,100
35	Rootwad Bank Structure - Type 1	36	Each	$2,800.00	$99,400
36	Rootwad Bank Structure - Type 2	9	Each	$2,700.00	$24,300
37	Bar IWM	125	Each	$850.00	$106,250
38	Stream IWM	9	Each	$800.00	$7,200
39	Overbank Woody Material	12	Each	$2,300.00	$27,600
40	Log Toe Bank Structure	18	Each	$2,000.00	$36,000
41	Off-bank Branch Cover	45	Each	$800.00	$36,000
42	Off-bank Log Cover	8	Each	$800.00	$6,400
43	Remove, Salvage, and Reinstall Chain Link Fence	0	Linear Foot	$20.00	$0
44	Chain Link Fence	0	Linear Foot	$25.00	$0
45	Water Service Point	2	Each	$20,000.00	$40,000
46	Meter	2	Each	$5,000.00	$10,000
47	Backflow Assembly	2	Each	$8,000.00	$16,000
48	Main Line	18,000	Linear Foot	$12.00	$216,000
49	Bubbler Irrigation System	110,000	Square Foot	$1.50	$165,000
50	Supplemental Watering (Construction Period)	4	Per Event	$5,000.00	$20,000
51	Type 1 Cutting Collection and Storage	1,486	Each	$5.00	$7,430
52	Type 2 Cutting Collection and Storage	809	Each	$5.00	$4,046
53	Type 1 Cutting Installation	1,486	Each	$12.00	$17,832
54	Type 2 Cutting Installation on Bench	178	Each	$15.00	$2,670
55	Type 2 Cutting Installation on Slope	309	Each	$15.00	$4,632
56	Type 2 Cutting Installation on Bank	322	Each	$12.00	$3,869
57	Brush Layer Collection and Storage	100	Each	$20.00	$2,000
58	Brush Layer Installation	100	Each	$50.00	$5,000

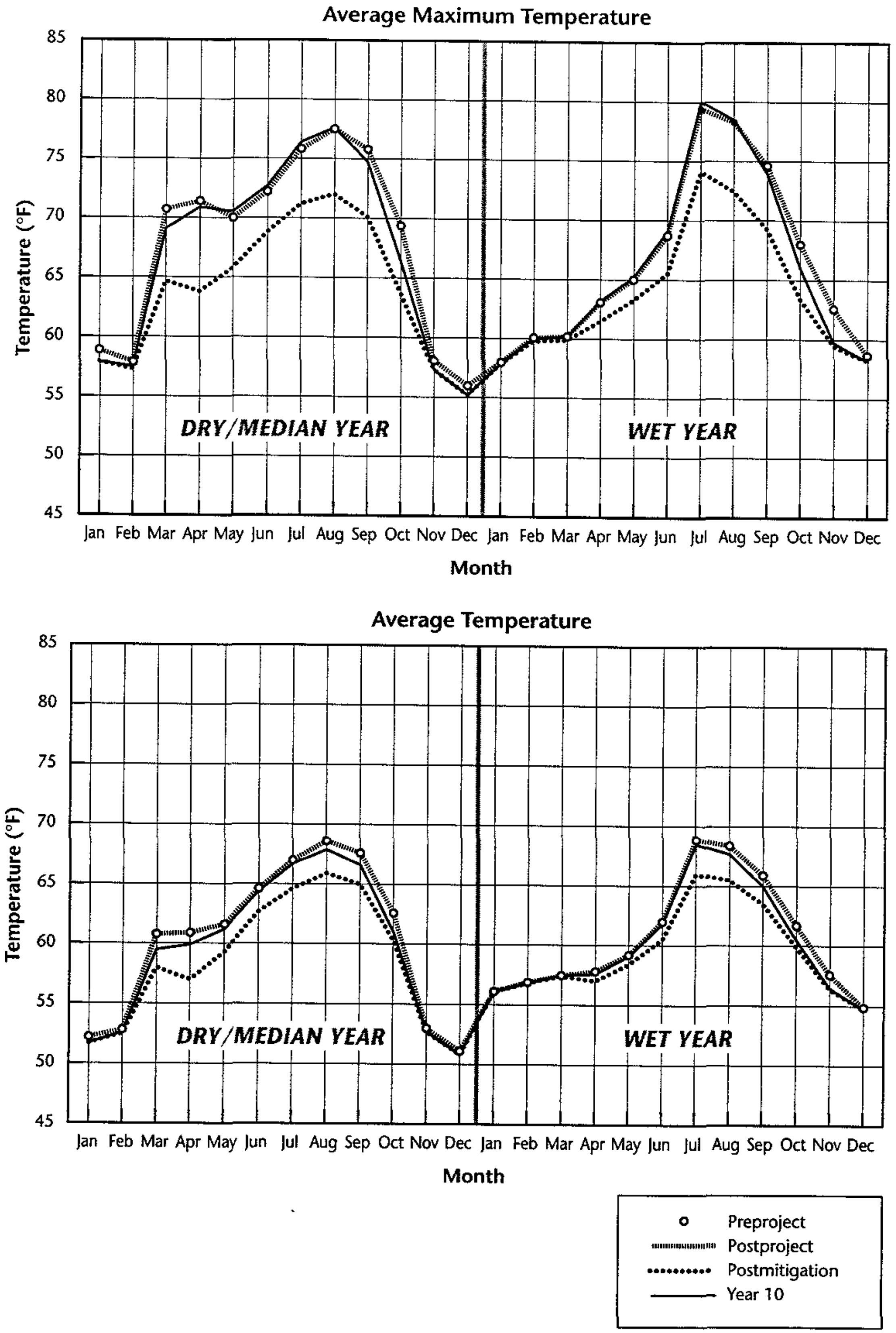
59	Willow Wattles (20-foot lengths)	20	Each	$2,500.00	$50,000
60	Container Plant Installation on Bench	2,049	Each	$15.00	$30,732
61	Container Plant Installation on Slope	1,558	Each	$15.00	$23,370
62	Container Plant Installation on Bank	519	Each	$15.00	$7,782
63	Acorn Planting	82	Each	$12.00	$989
64	Transplanting	91	Each	$1,000.00	$91,200
65	Seeding	20	Acre	$2,000.00	$40,000
66	Weed Control (3-year Maintenance Period)	12	Month	$5,000.00	$60,000
67	Irrigation Operation (3-yearMaintenance Period)	21	Month	$1,200.00	$25,200
68	Supplemental Watering (3-yearMaintenance Period)	18	Per Event	$2,000.00	$36,000
69	Replacement Planting (3-yearMaintenance Period)	2200	Each	$25.00	$55,000
70	Reseeding (Maintenance Period)	275,000	Square Foot	$0.05	$13,750
71	Plant Establishment Forms	36	Each	$500.00	$18,000
72	Record Drawings	1	Set	$15,000.00	$15,000
Subtotal					$4,086,700
Quantity and Unit Cost Contingency					$408,670
Total Estimated Cost					**$4,495,370**

Notes:

This cost estimate is based on the Draft Submittal Construction Documents (i.e., plans & specifications) prepared by Jones & Stokes and Northwest Hydraulic Consultants, dated July 19, 2000, and conceptual changes developed for the recommended project based on comments received form District staff.

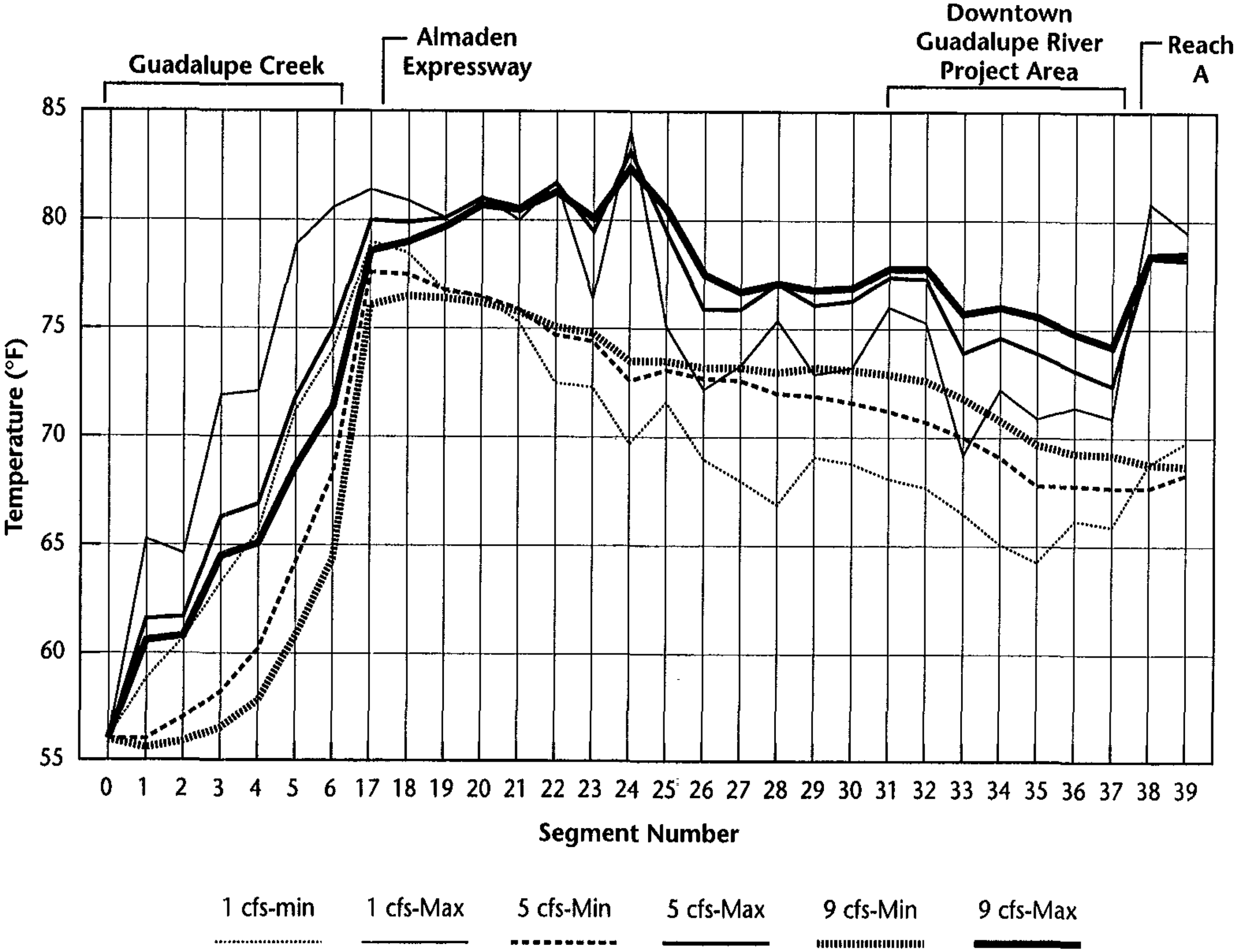
This cost estimate does not include subsequent phases of the project.

Appendix E. Supplemental Information



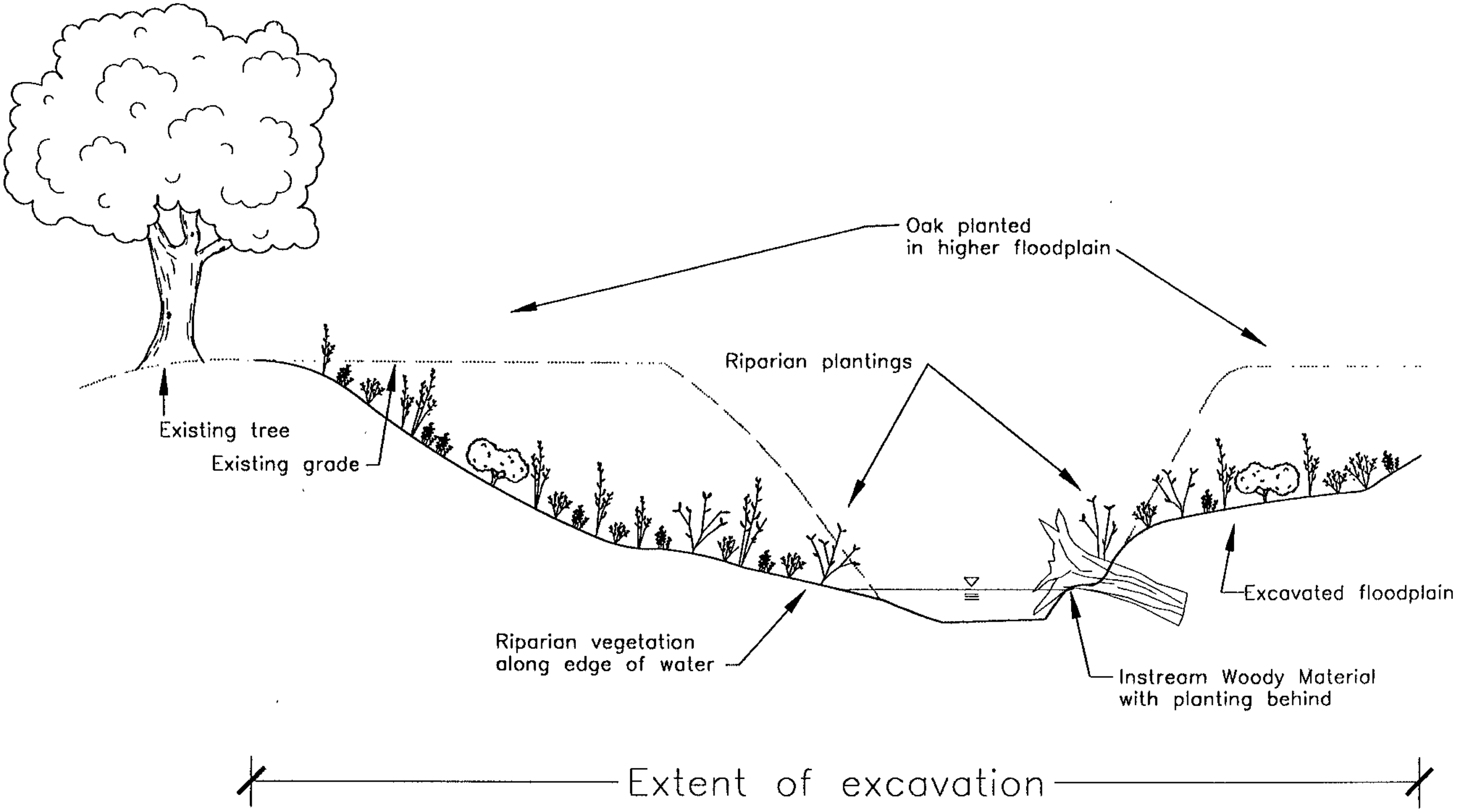
Jones & Stokes

Figure E-1-1
Simulated Temperatures in Guadalupe Creek for the Guadalupe River Project with Bypass System Alternative and the Guadalupe River Project with Refined Bypass System Alternative



Jones & Stokes

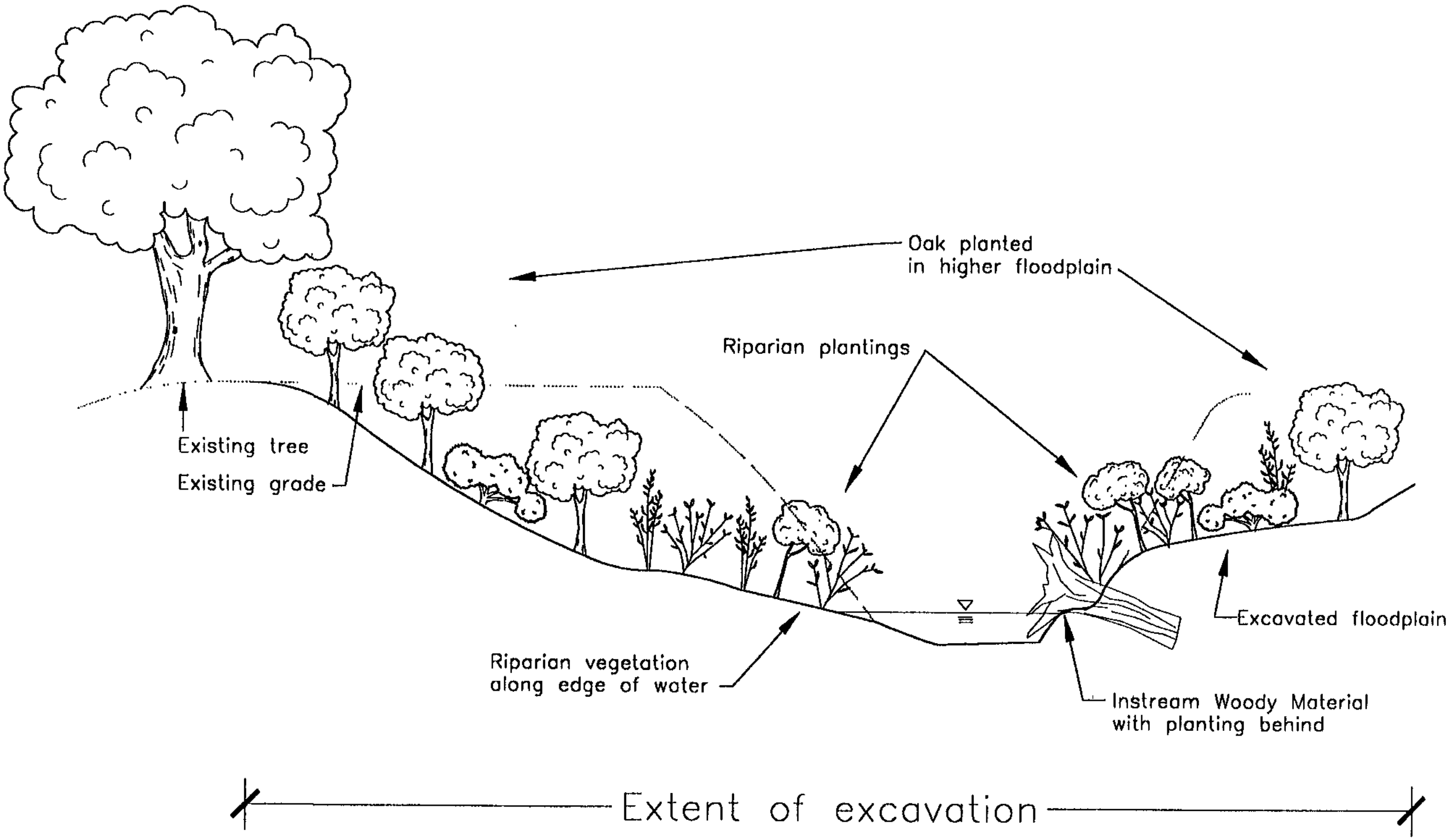
Figure E-2-1
Flow Sensitivity Analysis Results for Preproject Conditions as Shown by Simulated Average Minimum and Average Maximum Temperatures for August



00434.00 002

Jones & Stokes

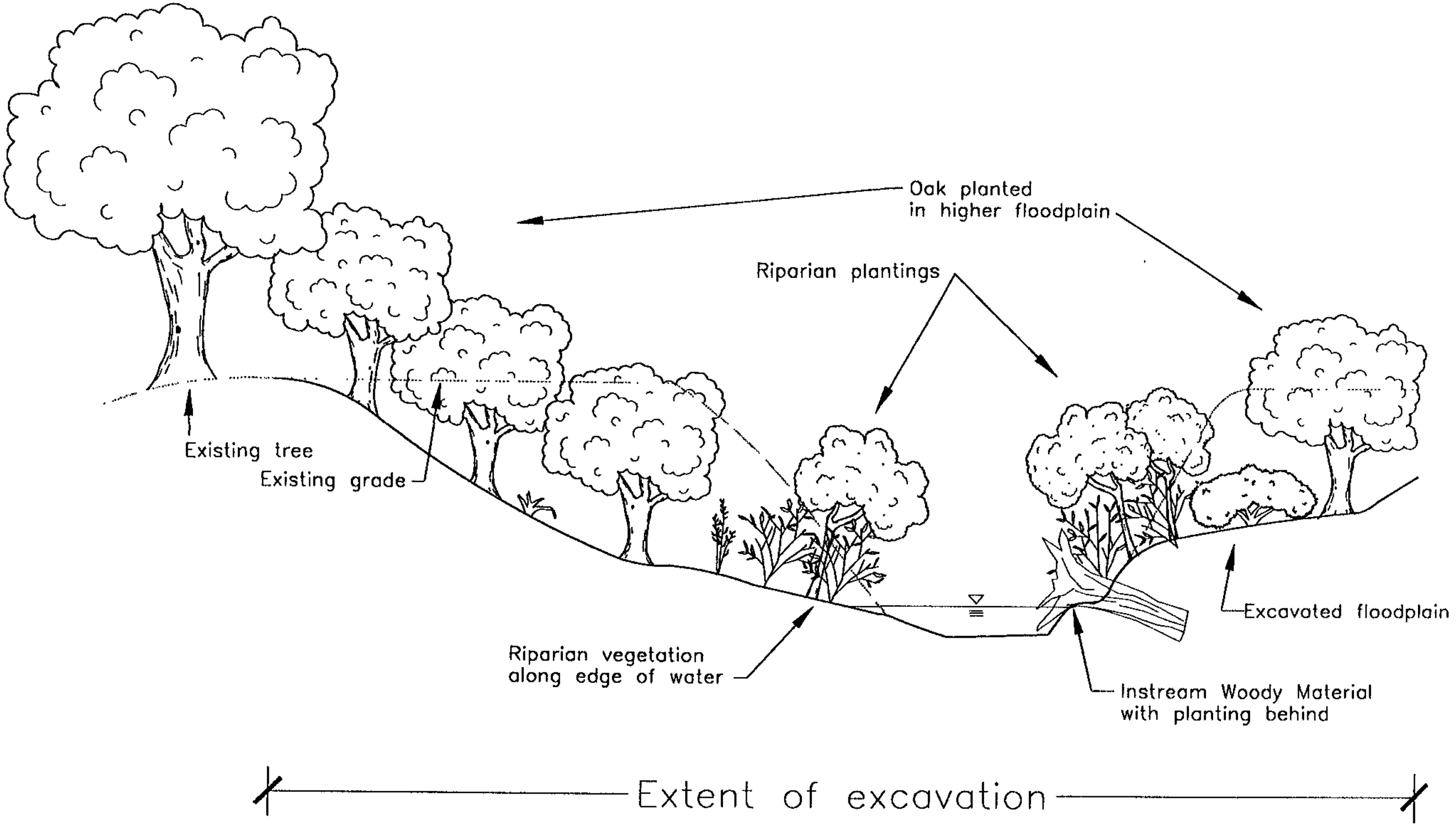
Figure E-3-1
Guadalupe Creek Proposed Project
Typical Cross Section 2 Years After Revegetation



00434.00 002

Jones & Stokes

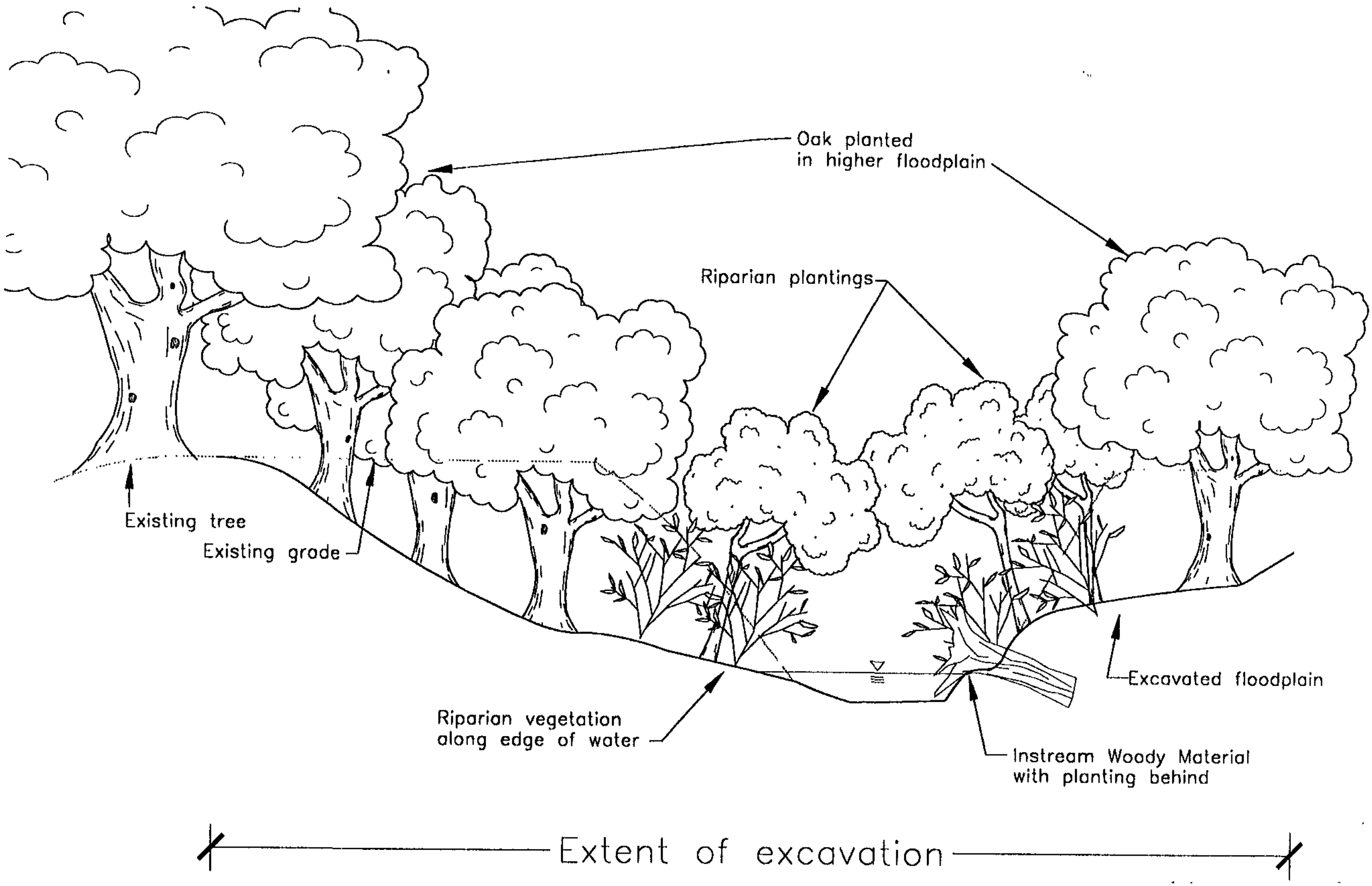
Figure E-3-2
Guadalupe Creek Proposed Project
Typical Cross Section 5 Years After Reveg[illegible]ion



00434 00 002

Jones & Stokes

Figure E-3-3
Guadalupe Creek Proposed Project
Typical Cross Section 10 Years After Revegetation



Jones & Stokes

Figure E-3-4
Guadalupe Creek Proposed Project
Typical Cross Section 40 Years After Revegetation

Guadalupe Creek Restoration
Planting Program
Planting Zone A
Water's Edge

DESCRIPTION

- This zone is located along the edge of the low-flow channel (approximately where mapped on the geomorphic series; approx. 10 cfs).
- It is approximately within 2 feet of the water's edge. Groundwater is between 0-3 feet.

REVEGETATION TECHNIQUES

Plant container stock and cuttings. Calculate quantities in linear feet.

REVEGETATION PROGRAM

Species Mix Development/Rationale for Planting Zone A

The species mix for Planting Zone A is based on the criteria and rationale identified for mix development and the species suitability matrix prepared by Jones & Stokes and reviewed by District staff.

Species		Flood Return Interval	Geo-morphic Surface	Depth to GW	Plant Mix	
Scientific Name	Common Name	<2	Bar	0-3'	Mix	%
Acer negundo	Box elder	Y	N	?	N	–
Alnus rhombifolia	White alder	Y	Y	Y	Y	20
Baccharis salicifolia	Mule fat	Y	Y	Y	Y	5
Platanus racemosa	Western sycamore	Y	Y	Y	Y	20
Populus fremontii	Fremont cottonwood	Y	Y	Y	Y	10
Quercus lobata	Valley oak	?	N	?	N	–
Salix exigua	Sandbar willow	Y	Y	Y	Y	10
Salix laevigata	Red willow	Y	Y	Y	Y	25
Salix lasiolepis	Arroyo willow	N	Y	Y	Y	10
					Total	100

Y = Yes; N = No; ? = Maybe

SOIL CONSTRAINTS

Because the depth to groundwater is between 0-3 feet and the zone is located along the water's edge, areas with low available water holding capacity soils are not considered a constraint. No soil loosening would be conducted.

OTHER ISSUES

Following project construction, existing water management facilities would continue to be operated to maintain a surface-water flow in Guadalupe Creek at the Almaden Expressway bridge of approximately 0.5 cfs.

Guadalupe Creek Restoration
Planting Program
Planting Zone B
Lower Slope

DESCRIPTION

- Generally, this planting zone has a flood return interval of < 2 years and/or groundwater is within 3 feet of the slope surface.
- The width and slope of this planting zone varies.

REVEGETATION TECHNIQUES

Plant container stock and cuttings. Calculate quantities in linear feet.

REVEGETATION PROGRAM

Species Mix Development/Rationale for Planting Zone B

The species mix for Planting Zone B: Lower Slope is based on the criteria and rationale identified for mix development and on the species suitability matrix (Table 1) prepared by Jones & Stokes and reviewed by District staff.

Species		Flood Return Interval (Years)	Geo-morphic Surface	Depth to GW	Existing Surface Plant Mix	
Scientific Name	Common Name	<2	Channel Slope	0-3'	Mix	%
Acer negundo	Box elder	Y	Y	?	N	–
Aesculus californica	California buckeye	N	Y	N	N	–
Alnus rhombifolia	White alder	Y	Y	Y	Y	5
Baccharis salicifolia	Mule fat	Y	Y	Y	Y	10
Platanus racemosa	Western sycamore	Y	Y	Y	Y	10
Populus fremontii	Fremont cottonwood	Y	Y	?	Y	5
Quercus lobata	Valley oak	?	N	?	N	–
Salix exigua	Sandbar willow	Y	Y	Y	Y	15
Salix laevigata	Red willow	Y	Y	Y	Y	30
Salix lasiolepis	Arroyo willow	Y	Y	Y	Y	25
					Total	***100***

Y = Yes; N = No; ? = Maybe

SOIL CONSTRAINTS

Because the depth to groundwater is between 0-3 feet, areas with low available water holding capacity soils are not considered a constraint.

OTHER ISSUES

Following project construction, existing water management facilities would continue to be operated to maintain a surface-water flow in Guadalupe Creek at the Almaden Expressway bridge of approximately 0.5 cfs.

Guadalupe Creek Restoration
Planting Program
Planting Zone C
Upper Slope and Lower Bench

DESCRIPTION

- Generally, this planting zone has a flood return period of 2-5 years for slopeareas and <5 years for bench areas, and/or groundwater is 3-8 feet below the surface.
- The width and slope of this planting zone varies.

REVEGETATION TECHNIQUES

Plant container stock and cuttings. Calculate quantities by area.

REVEGETATION PROGRAM

Species Mix Development/Rationale for Planting Zone C

The species mix for Planting Zone C is based on the criteria and rationale identified for mix development and the species suitability matrix prepared by Jones & Stokes and reviewed by District staff.

Species		Flood Return Interval	Geo-morphic Surface	Depth to GW	Normal Plant Mix		LAWHC Plant Mix	
Scientific Name	Common Name	2-5	Channel Slope	3-8	Mix	%	Mix	%
Acer negundo	Box elder	Y	Y	Y	Y	10	Y	10
Aesculus californica	California buckeye	Y	Y	Y	Y	10	Y	10
Alnus rhombifolia	White alder	N	Y	N	N	–	N	–
Artemisia californica	California sagebrush	Y	N	Y	N	–	Y	–
Baccharis salicifolia	Mule fat	Y	Y	Y	Y	5	Y	5
Platanus racemosa	Western sycamore	Y	Y	Y	Y	10	N	25
Populus fremontii	Fremont cottonwood	Y	Y	?	Y	10	N	10
Quercus agrifolia	Coast live oak	N	Y	Y	N	5	Y	–
Quercus lobata	Valley oak	Y	N	Y	Y	20	Y	15
Rosa californica	California rose	Y	N	Y	Y	5	Y	3
Salix exigua	Sandbar willow	?	Y	N	N	–	N	–
Salix laevigata	Red willow	?	Y	N	N	–	N	–
Salix lasiolepis	Arroyo willow	Y	Y	Y	Y	15	N	15
Sambucus mexicana	Elderberry	?	Y	Y	Y	5	Y	2
Umbellularia californica	California bay	Y	N	Y	Y	5	Y	5
					Total	***100%***		***100%***

Y = Yes; N = No; ? = Maybe; LAWHC = low available water holding capacity soils

SOIL CONSTRAINTS

The LAWHC species mix will be planted when the soil is deemed to have a low available water holding capacity (LAWHC). Loosening of the soil will be conducted where feasible before planting. Normal plant mix is to be applied in soils that do not have a LAWHC. Non-LAWHC soils either have a matrix texture of sandy loam or finer or have less than 35% cobbles and gravels. LAWHC plant mix is to be applied in soils that have a LAWHC. LAWHC soils have a matrix texture coarser than sandy loam or have greater than 35% cobbles and gravels.

OTHER ISSUES

Following project construction, existing water management facilities would continue to be operated to maintain a surface-water flow in Guadalupe Creek at the Almaden Expressway bridge of approximately 0.5 cfs.

Guadalupe Creek Restoration
Planting Program
Planting Zone D
Upper Bench and Bench Slopes

DESCRIPTION

- This zone has a flood return period of >5 years and/or groundwater is >8 feet below the surface.
- The width and slope of this planting zone will vary.

REVEGETATION TECHNIQUES

Planting container stock and cuttings. Calculate quantities by area.

REVEGETATION PROGRAM

Species Mix Development/Rationale for Planting Zone E

The species mix for Planting Zone E is based on the criteria and rationale identified for mix development and the species suitability matrix prepared by Jones & Stokes and reviewed by District staff.

Species		Flood Return Interval	Geo-morphic Surface	Depth to GW	Normal Plant Mix		LAWHC Plant Mix	
Scientific Name	Common Name	>5	Bench/ Bench Slope	>8'	Mix	%	Mix	%
Acer negundo	Box elder	Y	Y/Y	Y	Y	5	N	–
Aesculus californica	California buckeye	Y	Y/Y	Y	Y	15	Y	15
Artemisia californica	California sagebrush	Y	Y/Y	Y	Y	5	Y	5
Baccharis salicifolia	Mule fat	Y	Y/Y	Y	Y	0	N	–
Baccharis pilularis	Coyote brush	Y	Y/Y	Y	Y	2	Y	5
Platanus racemosa	Western sycamore	?	Y/Y	N	N	–	N	–
Populus fremontii	Fremont cottonwood	?	Y/?	N	N	–	N	–
Quercus agrifolia	Coast live oak	Y	Y/Y	Y	Y	20	Y	30
Quercus douglasii	Blue oak	Y	?/Y	Y	Y	15	Y	25
Quercus lobata	Valley oak	Y	Y/Y	Y	Y	20	Y	5
Rosa californica	California rose	Y	Y/Y	Y	Y	5	Y	5
Sambucus mexicana	Elderberry	Y	Y/Y	Y	Y	10	Y	10
Symphoricarpus albus	Snowberry	Y	Y/Y	N	Y	3	N	–
Umbellularia californica	California bay	Y	Y/Y	Y	Y	10	Y	5
					Total	***100***		***100***

Y = Yes; N = No; ? = Maybe; LAHWC = low available water holding capacity soils

SOIL CONSTRAINTS

The LAWHC species mix will be planted when the soil is deemed to have a low available water holding capacity (LAWHC). Normal plant mix is to be applied in soils that do not have a LAWHC. Non-LAWHC soils either have a matrix texture of sandy loam or finer or have less than 35% cobbles and gravels. LAWHC plant mix is to be applied in soils that have a LAWHC. LAWHC soils have a matrix texture coarser than sandy loam or have greater than 35% cobbles and gravels. Loosening of the soil will be conducted throughout the zone before planting.

OTHER ISSUES

Following project construction, existing water management facilities would continue to be operated to maintain a surface-water flow in Guadalupe Creek at the Almaden Expressway bridge of approximately 0.5 cfs.

Guadalupe Creek Restoration
Planting Program
Planting Zone E
Bar Surface

DESCRIPTION

- Either channel bars or bar surfaces (approximately mapped on the geomorphic series; approx. 10 cfs)
- Groundwater is within 0-8 feet of the surface, but depends on creek flow

REVEGETATION TECHNIQUES

Plant container stock and cuttings. Calculate quantities by number of units.

REVEGETATION PROGRAM

Species Mix Development/Rationale for Planting Zone E
The species mix for Planting Zone F is based on the criteria and rationale identified for mix development and the species suitability matrix prepared by Jones & Stokes and reviewed by District staff.

Species		Flood Return Interval	Geo-morphic Surface	Depth to GW	Plant Mix	
Scientific Name	Common Name	<2	Bar	0-3/3-8'	Mix	%
Acer negundo	Box elder	Y	N	N/Y	N	–
Alnus rhombifolia	White alder	Y	Y	Y/N	Y	15
Baccharis salicifolia	Mule fat	Y	Y	Y/Y	Y	15
Platanus racemosa	Western sycamore	Y	Y	Y/Y	Y	40
Populus fremontii	Fremont cottonwood	Y	Y	Y/?	Y	5
Quercus lobata	Valley oak	?	N	?/Y	N	–
Salix exigua	Sandbar willow	Y	Y	Y/N	Y	5
Salix laevigata	Red willow	Y	Y	Y/N	Y	15
Salix lasiolepis	Arroyo willow	N	Y	Y/Y	Y	5

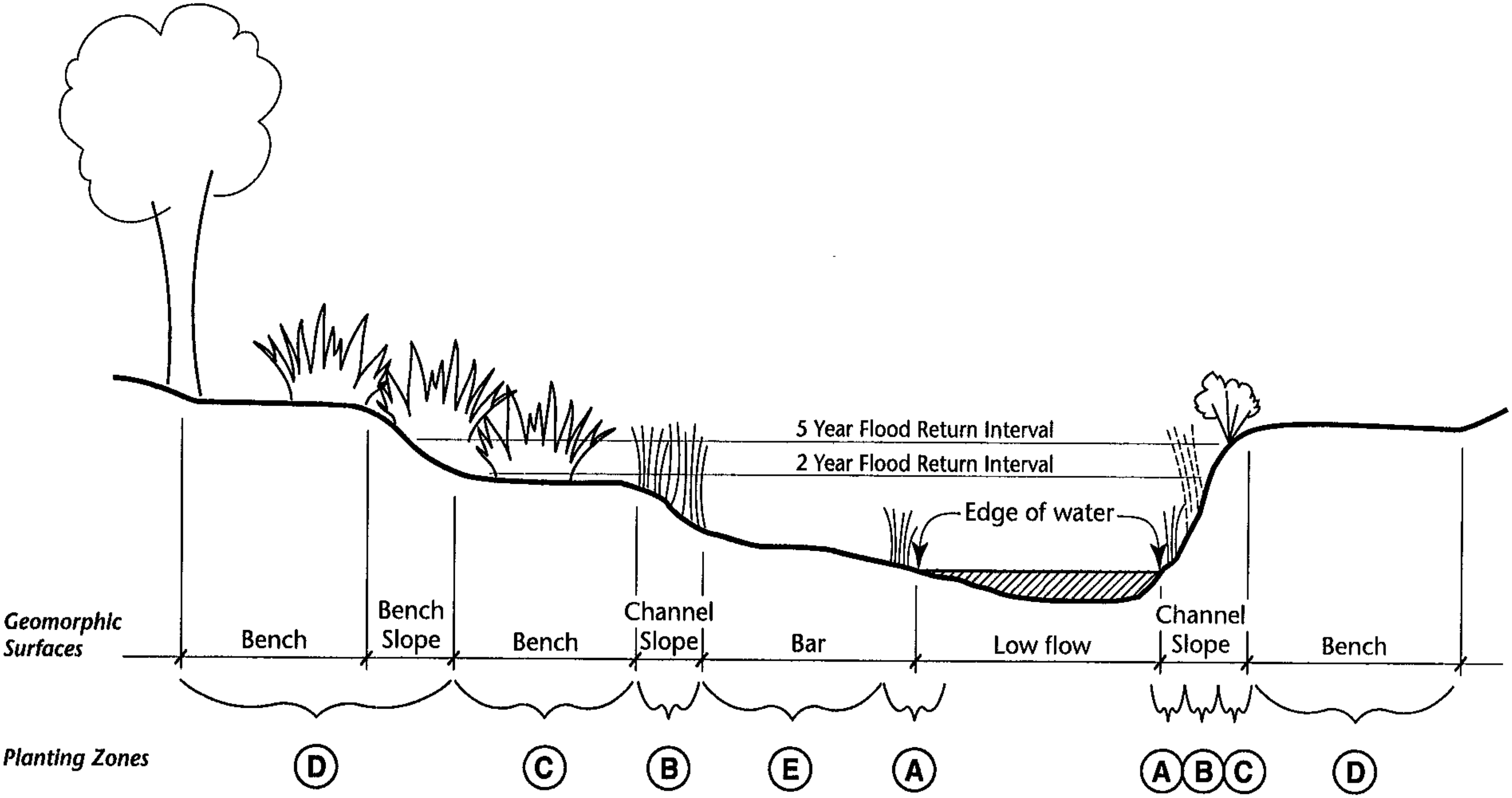
Y = Yes; N = No; ? = Maybe

SOIL CONSTRAINTS

The available water holding capacity is low in this zone. The depth to groundwater varies in this zone from 0 to 8 feet. Loosening of the soil will not be required because cobbles will be removed at the planting site before planting.

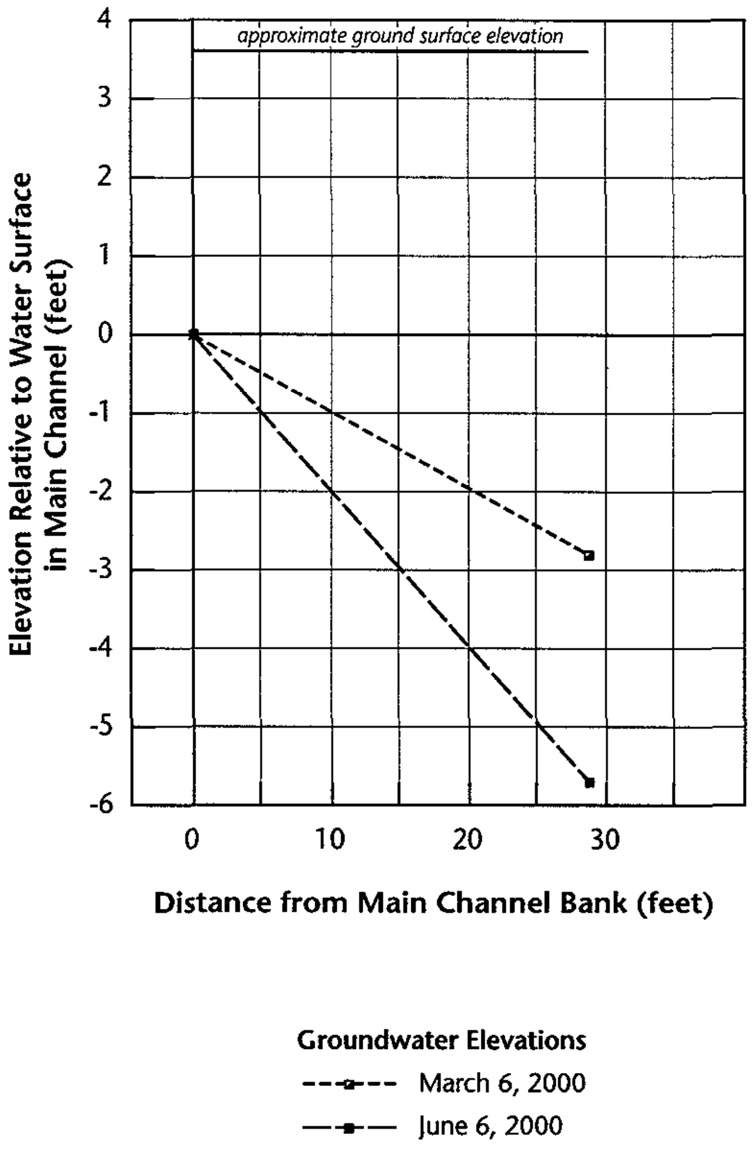
OTHER ISSUES

Following project construction, existing water management facilities would continue to be operated to maintain a surface-water flow in Guadalupe Creek at the Almaden Expressway bridge of approximately 0.5 cfs.



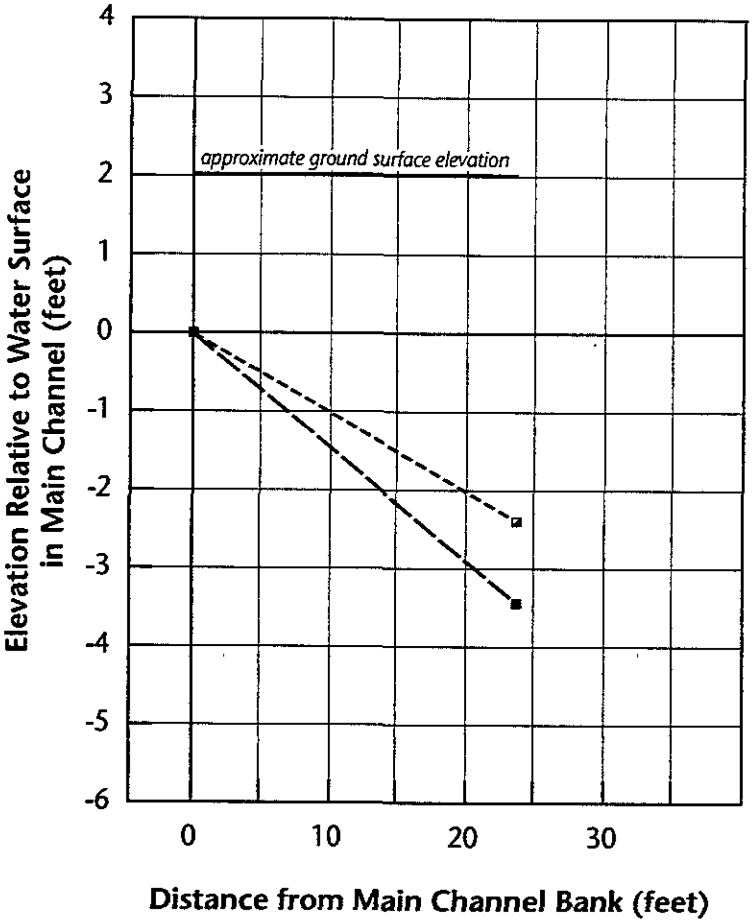
Not to Scale

Figure E-4-1
Geomorphic Surfaces Definition and Planting Zones Sketch



Ground surface elevations were measured on November 18–24, 1999
(data from Table 3.9)

Figure E-5-1
Relative Ground Surface and Groundwater Elevations at Reach 1



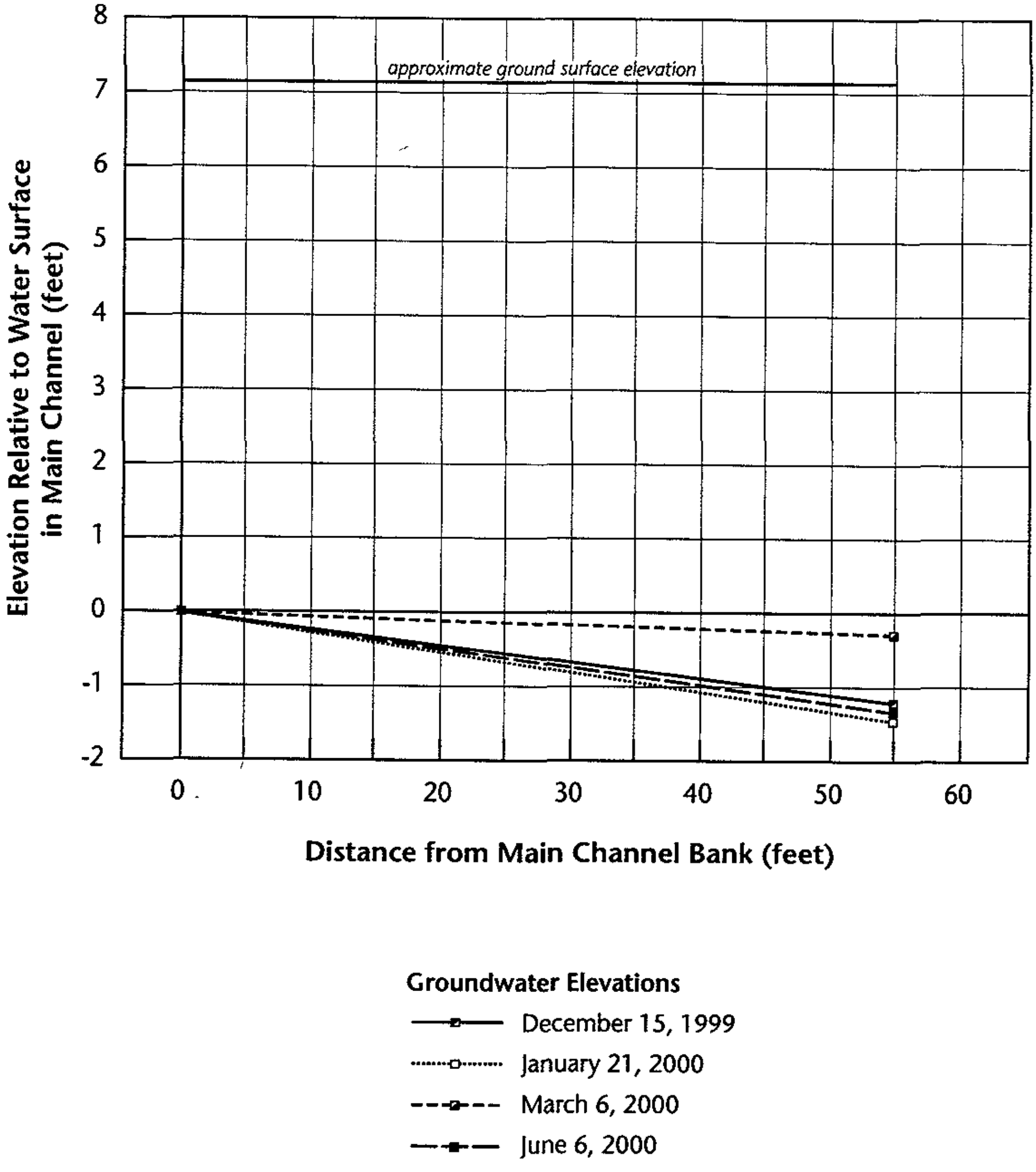
Groundwater Elevations

---□--- March 6, 2000

—■— June 6, 2000

Ground surface elevations were measured on November 18–24, 1999
(data from Table 3.9)

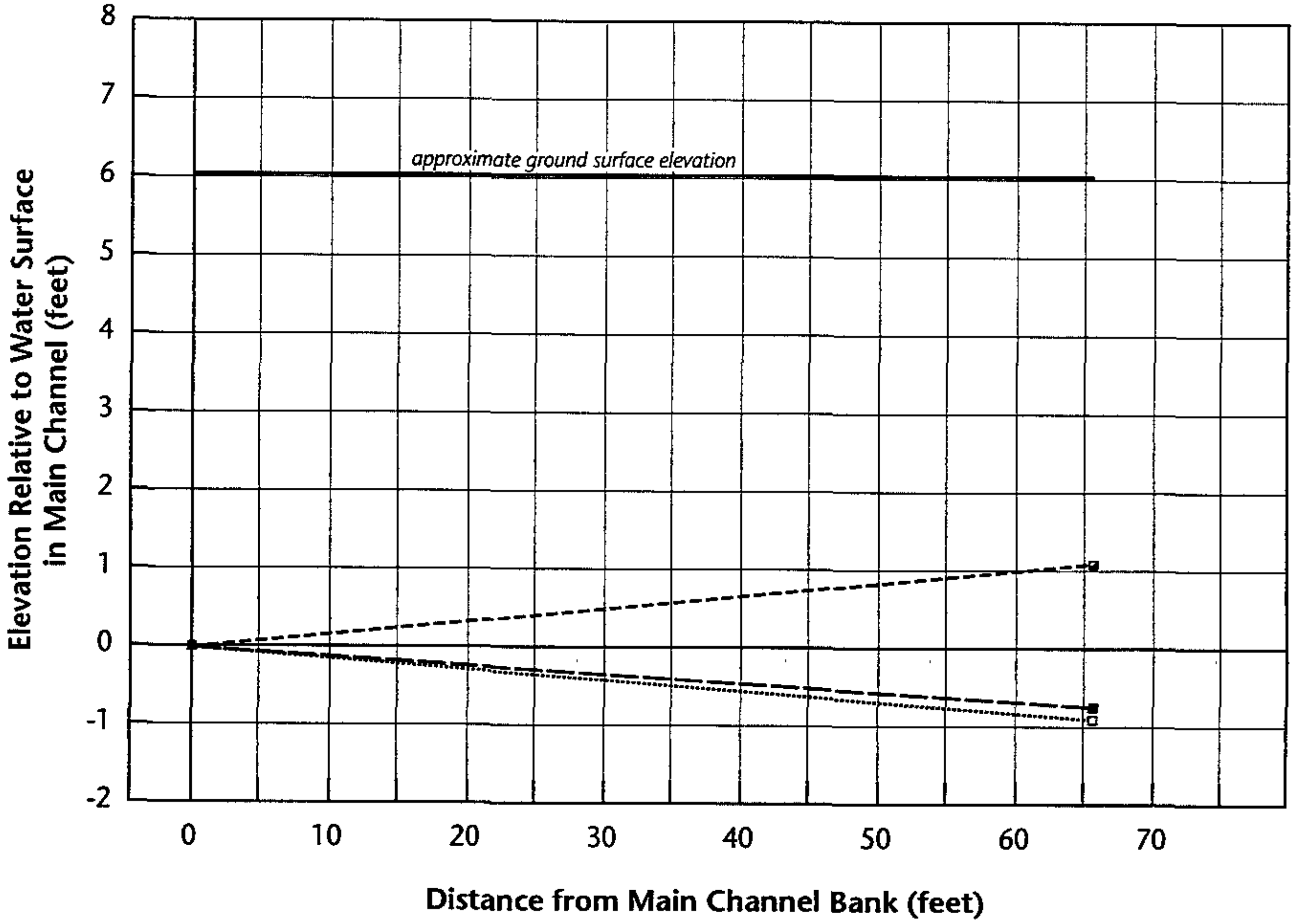
Figure E-5-2
Relative Ground Surface and Groundwater Elevations at Reach 2



Ground surface elevations were measured on November 18–24, 1999
(data from Table 3.9)

Jones & Stokes

Figure E-5-3
Relative Ground Surface and Groundwater Elevations
at Reach 3



Groundwater Elevations

- ·····□····· January 21, 2000
- - - -□- - - March 6, 2000
- —■— June 6, 2000

Ground surface elevations were measured on November 18–24, 1999
(data from Table 3.9)

Figure E-5-4
Relative Ground Surface and Groundwater Elevations
at Reach 4

SANTA CLARA VALLEY WATER DISTRICT

GUADALUPE CREEK RESTORATION PROJECT
BETWEEN ALMADEN EXPRESSWAY AND MASSON DAM

ENGINEER'S REPORT

AND

FINAL ENVIRONMENTAL IMPACT REPORT/
ENVIRONMENTAL IMPACT STATEMENT (SCH# 2000092025)

Project No. 3015

Engineer's Report Prepared by:

Alberto M. Gurevich, P.E.	Senior Project Manager
Devin A. Mody	Assistant Engineer
Tony T. Ndah	Assistant Engineer

Jones & Stokes Associates, Inc.

Final Environmental Impact Report/Environmental Impact Statement Prepared by:

Terrence A. Neudorf	Environmental Planner

Jones & Stokes Associates, Inc.

Prepared Under the Direction of:

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Assistant Operating Officer

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Assistant General Manager

MARCH 2001

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Larry Wilson	District 4		

ACKNOWLEDGEMENTS

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Paula Sparkman

# ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT
for
Guadalupe Creek Restoration Project from Almaden Expressway to Masson Dam
San Jose, California

Responsible State Lead Agency: Santa Clara Valley Water District
Responsible Federal Lead Agency: U.S. Army Corps of Engineers, Sacramento District

Abstract: This report describes and evaluates the potential environmental, social, and economic impacts of the proposed Guadalupe Creek Restoration Project, which involves riparian vegetation and fish habitat restoration along a 1.7- mile segment of Guadalupe Creek (City of San Jose, Santa Clara County, California) designated as critical habitat for steelhead by the National Marine Fisheries Service. The Guadalupe Creek Restoration Project comprises two phases. Phase 1 restoration plantings were completed in 1998. Phase 2, if implemented, will result in the installation of approximately 6 acres of riparian vegetation, approximately 13,000 linear feet (lf) of shaded riverine aquatic (SRA) cover vegetation, and various aquatic habitat features. This EIR/EIS specifically addresses the environmental impacts of Phase 2 of the Guadalupe Creek Restoration Project. This report will support decision making by the Santa Clara Valley Water District, U.S. Army Corps of Engineers, Sacramento District, and other responsible and cooperating agencies to implement Phase 2 and ensure compliance with the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and other pertinent laws and regulations. This EIR/EIS also addresses potential cumulative impacts of Phase 2 and associated mitigation measures.

The primary objective of the Guadalupe Creek Restoration Project is to restore SRA cover vegetation and improve aquatic habitat for anadromous fish (steelhead and chinook salmon) in lower Guadalupe Creek between Almaden Expressway and Masson Dam. Secondary objectives include: (1) creating 5,971 lf of SRA cover vegetation that may serve as offsite mitigation for impacts of the Guadalupe River Flood Protection Project in downtown San Jose; (2) creating riparian habitat that may provide mitigation credit for future Santa Clara Valley Water District projects or may result in a net increase in biological resources in the project area; (3) enhancing habitat for other special-status species along the project reach of Guadalupe Creek; (4) restoring physical processes and ecological functions along the project reach of Guadalupe Creek; (5) protecting existing infrastructure in the project area; (6) maintaining existing flood conveyance capacity; (7) minimizing impacts on existing resources; (8) improving groundwater recharge; (9) minimizing long-term operations and maintenance requirements; (10) minimizing impacts on existing water management operations; (11) striving to meet regional planning objectives as outlined in relevant regional planning documents; and (12) not precluding future recreation uses that are compatible with other project objectives.

This EIR/EIS analyses a range of alternative plans developed to meet the Guadalupe Creek Restoration Project's primary objective and further screened based on their expected success in achieving secondary project objectives. Alternatives considered include: channel and floodplain modification (proposed project/preferred alternative); reduced channel and floodplain modification; minimal channel and floodplain modification; and the No-Project Alternative. The proposed

project/preferred alternative includes channel relocation, floodplain development, and bank stabilization to enhance instream habitat and support the establishment of SRA vegetation. Implementation of the proposed project/preferred alternative would involve shifting approximately 2,500 lf of existing stream channel, excavating and removing approximately 42,000 cubic yards of material and importing 13,000 cubic yards of material to create planting sites. In addition, under the proposed project/preferred alternative, approximately 725 lf of bank protection features would be installed and approximately 6 acres of riparian vegetation and approximately 13,000 lf of SRA cover vegetation would be established. The proposed project/preferred alternative would fulfill all primary and secondary Guadalupe Creek Restoration Project objectives.

Summary

S.1 INTRODUCTION

S.1.1 Project Background

This environmental impact report/environmental impact statement (EIR/EIS) addresses the potential environmental effects of the Guadalupe Creek Restoration Project, including the proposed project (environmentally superior/environmentally preferable alternative), the No-Project Alternative, and two additional project alternatives. This report will support decision making by the Santa Clara Valley Water District (District), U.S. Army Corps of Engineers, Sacramento District (Corps)[1], and other responsible and cooperating agencies to implement the project and ensure compliance with the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and other pertinent laws and regulations. This EIR/EIS has been prepared by the District and the Corps, which serve as state and federal lead agencies, respectively.

The Guadalupe Creek Restoration Project involves restoring riparian vegetation and anadromous fish habitat along 1.7 miles of Guadalupe Creek in Santa Clara County, California (Figure 1, Figure 2). Guadalupe Creek is part of the Guadalupe River system and joins the river upstream of Almaden Lake (Figure 1).

The Guadalupe Creek Restoration Project comprises two separate planting and restoration phases. Phase 1 was completed in 1998 and included planting along 1,263 linear feet (lf) of Guadalupe Creek downstream from Masson Dam. Phase 2, if implemented, will result in the installation of approximately 6 acres of riparian vegetation and approximately 13,000 lf of SRA cover vegetation as well as various aquatic habitat features in the lower reaches of Guadalupe Creek between Almaden Expressway and Masson Dam. This EIR/EIS specifically addresses the environmental impacts of Phase 2 of the Guadalupe Creek Restoration Project, which is referred to in this document as the proposed project.

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[1] For brevity, *Corps* is used in this EIR/EIS to refer to the U.S. Army Corps of Engineers, Sacramento District. Other Districts of the U.S. Army Corps of Engineers are referenced by their full names.

S.1.2 Purpose of the Proposed Project

The purpose of the proposed project is to restore native coldwater fish habitat that has been lost or degraded as a result of urbanization and previous stream modifications. A key feature of the proposed project is the restoration of a substantial amount of shaded riverine aquatic (SRA) cover vegetation along the project reaches of Guadalupe Creek. As it matures, the restored SRA vegetation will increase stream shading and improve the quality of coldwater fish habitat in the project area by reducing water temperatures. The proposed project also provides for channel modifications and installation of instream features that will improve fish habitat by restoring natural stream and floodplain functions and increasing the hydraulic diversity of the channel in the project area. Fish that will benefit from the project include the anadromous species steelhead (*Oncorhynchus mykiss*, federally listed as threatened) and fall-run chinook salmon (*Oncorhynchus tshawytscha*, a federal candidate species). The segment of Guadalupe Creek downstream of Guadalupe Reservoir, which includes the project area, has been identified as critical steelhead habitat by the National Marine Fisheries Service (NMFS).

In addition to benefiting native anadromous fish, approximately 5,971 lf[2] of the SRA cover vegetation planted along Guadalupe Creek under the proposed project may serve as offsite mitigation for impacts of the Guadalupe River Flood Protection Project in downtown San Jose (Downtown Project; see Figure 1a), if the Downtown Project is implemented (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). However, the proposed project is independent of the Downtown Project and will be implemented even if the Downtown Project is not constructed. Vegetation established under the proposed project will likely exceed the Downtown Project's mitigation requirements. The additional vegetation may be used as mitigation credit for future District projects, or the District could choose to treat the additional vegetation as "enhancement opportunities" by foregoing its use as mitigation credits for future projects. If any of the additional SRA vegetation planted under the proposed project is used for mitigation credit, the District will cooperate with resource and regulatory agencies to develop and implement a mitigation credit system.

S.2 PUBLIC AND AGENCY INVOLVEMENT AND PROJECT SCOPING

Input from members of the public and from interested organizations and agencies was an essential component in the development of the proposed project and in scoping for this EIR/EIS. *Scoping* refers to the process used to: identify the range of project alternatives and mitigation measures to be analyzed in depth; establish methods of assessment; and select the environmental effects to be considered in detail. Tools used in scoping for this EIR/EIS included early public and interagency consultation, public scoping meetings, preparation of an initial study/environmental assessment (IS/EA), and publication of the project Notice of Preparation/Notice of Intent. Concerns identified during the scoping process are discussed below in *S.6 Issues of Known Controversy* and in Chapter 1.

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[2] A total of 7,217 lf of existing and planned SRA cover vegetation on Guadalupe Creek has been designated as potential offsite mitigation for the Downtown Project (1,246 lf planted in 1998 under Phase 1 of the Guadalupe Creek Restoration Project and 5,971 lf that will be planted under the proposed project, if it is implemented).

S.3 PROJECT OBJECTIVES

S.3.1 Primary Objective

The primary objective of the Guadalupe Creek Restoration Project is to restore SRA cover vegetation and improve aquatic habitat for anadromous fish (steelhead and chinook salmon) in lower Guadalupe Creek between Almaden Expressway and Masson Dam. Restoring SRA cover vegetation and improving aquatic habitat will create and maintain suitable water temperatures, increase organic material (e.g., leaf and insect drop), and provide habitat to support all life stages of anadromous fish.

S.3.2 Secondary Objectives

Secondary objectives of the Guadalupe Creek Restoration Project represent key physical, ecological, regulatory, and societal benefits other than the project's primary objective that may be achieved through project implementation. Expected success in achieving these secondary project objectives was used to evaluate potential project alternatives and to identify alternatives for detailed consideration in this document. The project's secondary objectives are:

- to create 5,971 lf of SRA cover vegetation that may serve as offsite mitigation for impacts of the Guadalupe River Flood Protection Project;
- to create riparian habitat, including SRA cover vegetation, that may provide mitigation credit for future District projects, or may represent "enhancement opportunities" resulting in a net increase in biological resources in the project area, consistent with District policy;
- to enhance habitat for other special-status species along the project reach of Guadalupe Creek;
- to restore physical processes and ecological functions along the project reach of Guadalupe Creek;
- to protect existing infrastructure in the project area;

- to maintain existing flood conveyance capacity;
- to minimize impacts on existing resources;
- to improve recharge of groundwater aquifers;
- to minimize long-term operations and maintenance requirements;
- to minimize impacts on existing water management operations;
- to strive to meet regional planning objectives as outlined in relevant regional planning documents; and
- not to preclude future recreation uses that are compatible with other project objectives.

S.4 PROPOSED PROJECT AND ALTERNATIVES

S.4.1 Alternatives Development

The development of the alternatives evaluated in this EIR/EIS was based on a thorough screening process. During the project planning phase, project objectives served to guide the development of project alternatives and to screen out less desirable alternatives. Selection of practicable alternatives was based on an assessment of (1) their ability to meet stated project objectives; (2) their potential long-term environmental, economic, and social impacts; and (3) (pursuant to CEQA and NEPA requirements) consideration of future conditions in the absence of any action. In addition, issues and concerns raised during the scoping process by various resource and regulatory agencies and other interested parties and individuals were considered in the development and evaluation of alternatives.

S.4.2 Channel and Floodplain Modification (Preferred Alternative/Proposed Project)

The Channel and Floodplain Modification Alternative (proposed project) emphasizes modifying channel and floodplain surfaces via channel relocation, floodplain development, and bank stabilization to enhance instream habitat and create conditions suitable for the establishment and long-term viability of SRA vegetation (Figures 4–7, Figure 8). Under the proposed project, floodplain excavation would extend beyond the 15-foot planting zone (relative to the low-flow channel) to compensate for reduction in flood conveyance capacity associated with planting riparian vegetation. Implementation of the proposed project would involve shifting approximately 2,500 lf of existing stream channel, excavating and removing approximately 42,000 cubic yards of material and importing 13,000 cubic yards of material to create suitable planting sites. In addition, approximately 725 lf of bank protection features would be installed, and approximately 6 acres of riparian vegetation and approximately 13,000 lf of SRA cover vegetation would be established under the proposed project.

S.4.3 Reduced Channel and Floodplain Modification (Alternative 1)

The Reduced Channel and Floodplain Modification Alternative (Alternative 1) would incorporate many of the restoration features specified for the proposed project. However, under Alternative 1, excavation would focus on the 15-foot zone adjacent to the low-flow channel, and the number of proposed channel shifts would be reduced relative to the proposed project. Planting densities would also be reduced to compensate for reduced flood conveyance capacity. Implementation of Alternative 1 would involve shifting approximately 1,200 lf of existing stream channel, excavating and removing approximately 31,000 cubic yards of material, and importing 8,500 cubic yards of material to create suitable planting sites. In addition, under Alternative 1, approximately 1,095 lf of bank protection features would be installed, and approximately 4 acres of riparian vegetation and 9,500 lf of SRA cover vegetation would be established.

S.4.4 Minimal Channel and Floodplain Modification Alternative (Alternative 2)

The Minimal Channel and Floodplain Modification Alternative (Alternative 2) would also incorporate many of the restoration features specified for the proposed project. However, under Alternative 2, the amount of bank excavation would be substantially reduced and excavation would be restricted to key areas within the 15-foot zone adjacent to the low-flow channel. Only one minor channel planform shift would occur under Alternative 2. Planting densities would be correspondingly reduced to compensate for reduced flood conveyance capacity. The number of bank and bed stabilization structures installed under Alternative 2 would be substantially increased to reduce the potential for channel incision and bank erosion. Implementation of Alternative 2 would involve shifting approximately 300 lf of existing stream channel, excavating and removing approximately 11,500 cubic yards of material, and importing 7,000 cubic yards of material to create suitable planting sites. In addition, approximately 1,285 lf of bank protection features would be installed, and approximately 2.3 acres of riparian vegetation and 6,800 lf of SRA cover vegetation would be established under Alternative 2.

S.4.5 No-Project Alternative (Alternative 3)

CEQA compliance requires the analysis of a No-Project Alternative; this is equivalent to the NEPA No-Action Alternative. The No-Project Alternative assumes "existing conditions" and evaluates the "likely future conditions" in the project area without implementation of the proposed project. Under this alternative, no additional riparian and SRA cover habitat would be created and aquatic habitat would not be enhanced within the project area. Water temperatures and aquatic habitat would continue to be less than optimal for anadromous fish species.

S.5 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION

Table S-1 summarizes the potential impacts of the proposed project, Alternatives 1 and 2, and the No-Project Alternative. Table S-1 also summarizes proposed mitigation measures to avoid, minimize, or compensate for potential impacts. Detailed analyses of direct and indirect environmental impacts and comprehensive descriptions of proposed mitigation measures are presented in Chapter 4 and the project Mitigation and Monitoring Plan (MMP). Chapter 5 discusses likely cumulative impacts associated with the proposed project and project alternatives.

S.6 IDENTIFICATION OF THE ENVIRONMENTALLY SUPERIOR ALTERNATIVE/ENVIRONMENTALLY PREFERABLE ALTERNATIVE

Pursuant to the requirements of CEQA and NEPA, the Channel and Floodplain Modification Alternative (proposed project) has been identified as the environmentally superior/environmentally preferable alternative. The environmentally superior/environmentally preferable alternative is the alternative that will result in the least damage to the biological and physical environment and the alternative that will protect, preserve, and enhance historic, cultural, and natural resources while accomplishing the project's objectives. Implementation of the Floodplain and Channel Modification Alternative would meet the primary objective of restoring shaded riverine aquatic (SRA) cover vegetation and improving aquatic habitat for anadromous fish, and would result in a substantial increase in biological resources in the project area. The net benefits to the environment associated with the proposed project—the establishment of 6 acres of riparian vegetation and approximately 13,000 linear feet of SRA cover vegetation—are much greater than those associated with Alternatives 1 and 2. The proposed project also meets the secondary objectives of creating riparian habitat, enhancing aquatic habitat, and restoring natural ecological and physical processes while maintaining existing flood conveyance capacity and minimizing impacts on existing resources. Although implementation of the proposed project would have slightly greater impacts on existing vegetation than the other alternatives, these impacts are relatively minor in comparison with the proposed project's expected net benefits to the environment. In addition, features associated with the proposed project (e.g., extensive floodplain excavation) may improve existing mercury-related site conditions (e.g., transport of mercury-bearing sediments, formation of methyl mercury, and mercury bioaccumulation), resulting in a greater net benefit to aquatic habitat and water quality than the other alternatives. Although the No-Project Alternative would result in fewer direct environmental impacts than the proposed project, it would not meet project objectives, nor would it improve water temperatures or provide habitat for anadromous fish species. The selection of the Floodplain and Channel Modification Alternative as the environmentally superior alternative is based on the conclusions of the impact analysis presented in Chapters 4 and 5 of this EIR/EIS. The proposed project also meets the requirements stipulated under Section 230.10(a) of the Clean Water Act for the "least environmentally damaging" alternative.

S.7 ISSUES OF KNOWN CONTROVERSY

Scoping for the proposed project identified several public concerns. Areas of concern identified through early project scoping meetings included:

- recreation and public access;
- flood protection; and
- physical and ecological functions of the creek corridor, including habitat for special-status species.

Most of the scoping letters received during the preparation of this EIR/EIS addressed concerns regarding effects related to existing mercury contamination in the project area. The main issues identified fell into three categories:

- human health effects,
- bioaccumulation of mercury in wildlife, and
- methods for transporting contaminated material excavated and removed from the project site.

Restoration of physical and ecological functions of the creek corridor and maintenance of existing flood conveyance capacity are specifically articulated in the objectives for the proposed project (see Chapter 2). This EIR/EIS addresses recreation and public access issues in Section 4.10, human health issues in Section 4.6, mercury bioaccumulation in Section 4.2, and transport of mercury-contaminated materials in Sections 4.4 and 4.6. Responses to public and agency comments are presented in Appendix D.

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Chapter 1. Introduction

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The purpose of the proposed project is to restore native anadromous fish habitat that has been lost or degraded as a result of urbanization and previous stream modifications. Species that will benefit from the project include steelhead (*Oncorhynchus mykiss*, federally listed as threatened) and fall-run chinook salmon (*Oncorhynchus tshawytscha*, a candidate for federal listing). In addition to benefiting native anadromous fish, approximately 5,971 lf[2] of the SRA cover vegetation planted along Guadalupe Creek under the proposed project may serve as offsite mitigation for impacts of the Guadalupe River Flood Protection Project in downtown San Jose (Downtown Project; see Figures 1a-c and Figure 2), if the Downtown Project is implemented (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). However, the proposed project is independent of the Downtown Project and will be implemented even if the Downtown Project is not realized. Vegetation established by the proposed project will likely exceed the Downtown Project's mitigation requirements. The additional vegetation may be used as mitigation credit for future District projects, or the District could choose to treat the additional vegetation as "enhancement opportunities" by foregoing its use as mitigation credits for future projects. If any of the additional SRA vegetation planted under the proposed project is used for mitigation credit, the District will cooperate with resource and regulatory agencies to develop and implement a mitigation credit system.

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[1] For brevity, *Corps* is used in this EIR/EIS to refer to the U.S. Army Corps of Engineers, Sacramento District. Other Districts of the U.S. Army Corps of Engineers are referenced by their full names.

1.2 BACKGROUND: OVERVIEW OF CEQA/NEPA ENVIRONMENTAL COMPLIANCE FOR THE PROPOSED PROJECT

The District served as the state lead agency for preparation of environmental documentation in compliance with CEQA. If part or all of the proposed project is used to mitigate Downtown Project impacts, the District may receive partial compensation for project costs; federal cost-sharing would necessitate NEPA compliance. Therefore, the District and the Corps cooperated to oversee the preparation of this EIR/EIS, which is a joint document intended to comply with both CEQA and NEPA (CEQA Guidelines Section 15222, 40 CFR 1506), with the Corps serving as the lead federal agency for NEPA compliance.

The District and the Corps initiated the environmental compliance process for the proposed project by preparing an initial study/environmental assessment (IS/EA) to evaluate possible project impacts. Development of the draft IS/EA showed that the proposed project has the potential to result in significant environmental impacts. According to the state's CEQA Guidelines, if there is "substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment," the agency is required to prepare an EIR (CEQA Guidelines 15064[a][1]). In compliance with CEQA, the lead agencies therefore chose to prepare an EIR/EIS in order to investigate project impacts more fully, and in order to provide additional opportunity for public review of and comment on the proposed project. Once the EIR/EIS is finalized, CEQA and NEPA require the preparation of *Findings* and a *Record of Decision*, respectively. If the Findings of this EIR/EIS show that significant unavoidable impacts will result from implementation of the proposed project, the District and the Corps will choose either (1) to publish a Statement of Overriding Considerations and proceed with the proposed project, or (2) to implement one of the project alternatives (see Chapter 2) that would not result in significant impacts.

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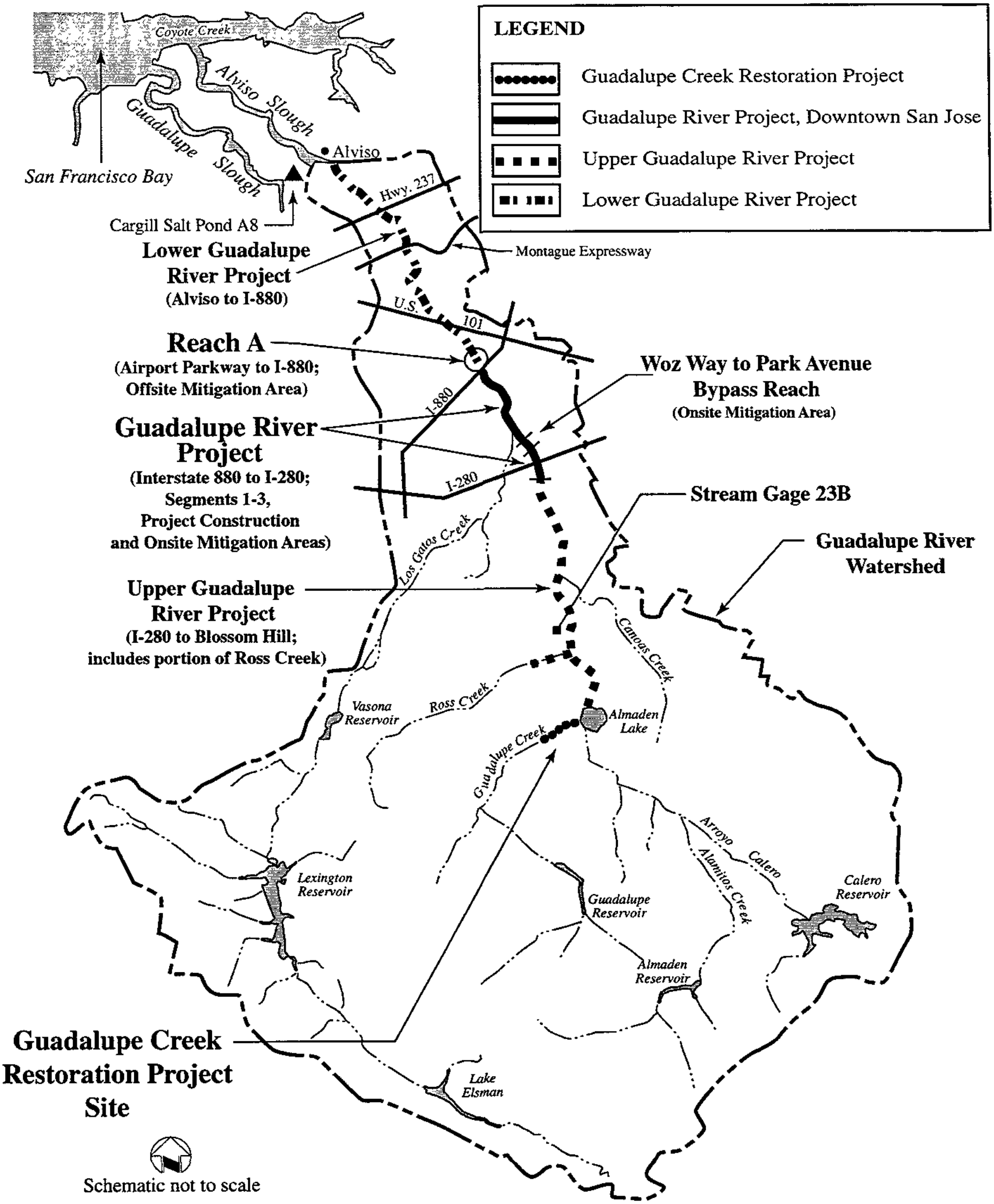
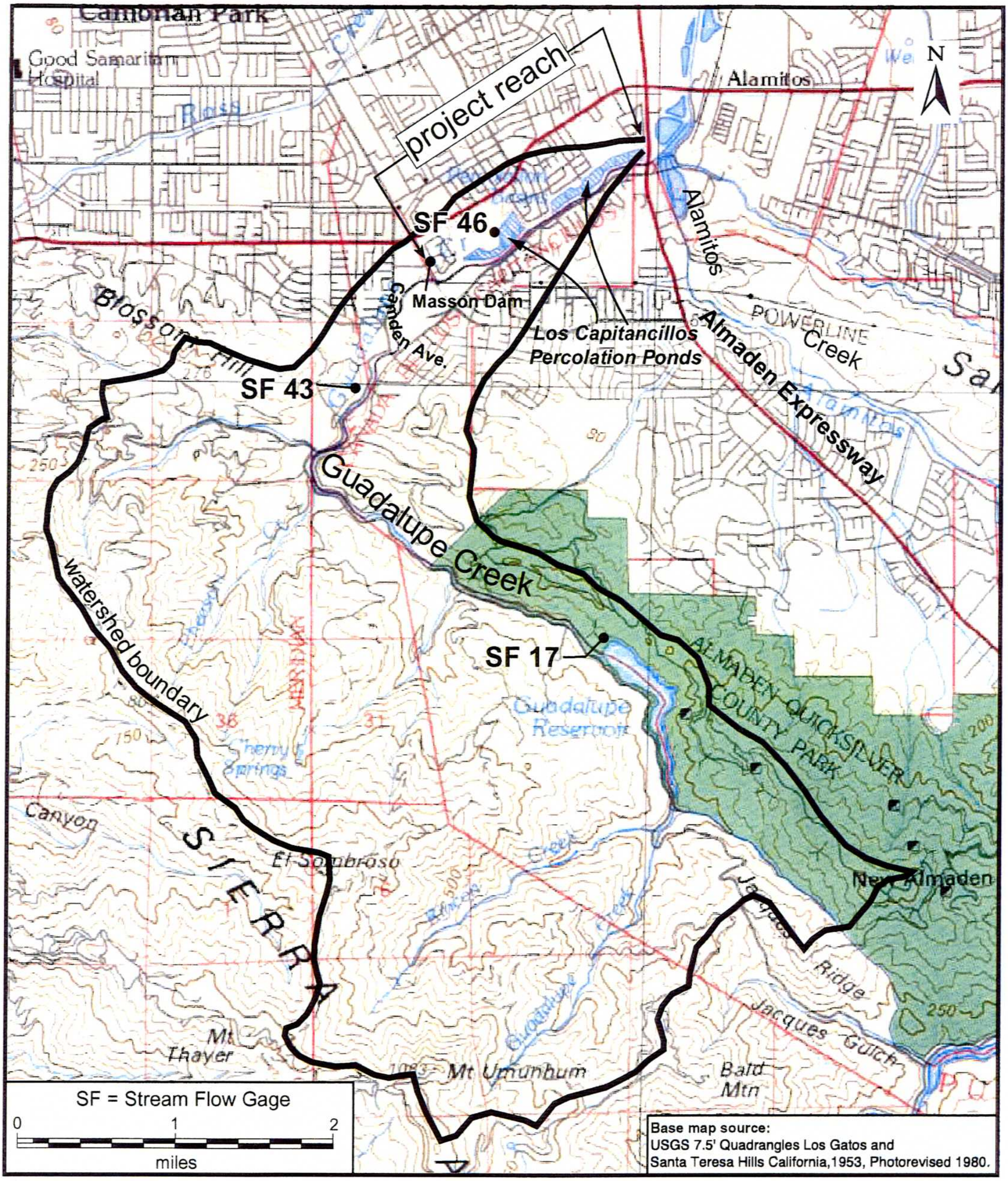
[2] A total of 7,217 lf of existing and planned SRA cover vegetation on Guadalupe Creek has been designated as potential offsite mitigation for the Downtown Project (1,246 lf planted in 1998 under Phase 1 of the Guadalupe Creek Restoration Project and 5,971 lf that will be planted under the proposed project, if it is implemented).


LEGEND
Guadalupe Creek Restoration Project
Guadalupe River Project, Downtown San Jose
Upper Guadalupe River Project
Lower Guadalupe River Project
Coyote Creek
Alviso Slough
Guadalupe Slough
San Francisco Bay
Alviso
Cargill Salt Pond A8
Hwy. 237
Montague Expressway
Lower Guadalupe River Project
(Alviso to I-880)
U.S. 101
Reach A
(Airport Parkway to I-880; Offsite Mitigation Area)
Woz Way to Park Avenue Bypass Reach
(Onsite Mitigation Area)
I-880
Guadalupe River Project
(Interstate 880 to I-280; Segments 1-3, Project Construction and Onsite Mitigation Areas)
I-280
Stream Gage 23B
Guadalupe River Watershed
Los Gatos Creek
Upper Guadalupe River Project
(I-280 to Blossom Hill; includes portion of Ross Creek)
Canoas Creek
Vasona Reservoir
Ross Creek
Almaden Lake
Guadalupe Creek
Arroyo Calero
Alamitos Creek
Lexington Reservoir
Guadalupe Reservoir
Calero Reservoir
Almaden Reservoir
Lake Elsman
Guadalupe Creek Restoration Project Site
Schematic not to scale

Jones & Stokes

Figure 1a
Guadalupe River Watershed, Showing Locations of Guadalupe Creek Restoration Project and Guadalupe River Flood Protection Projects



Base map source:
USGS 7.5' Quadrangles Los Gatos and
Santa Teresa Hills California,1953, Photorevised 1980.

Jones & Stokes

Figure 1b
Guadalupe Creek Drainage Basin and Project Area

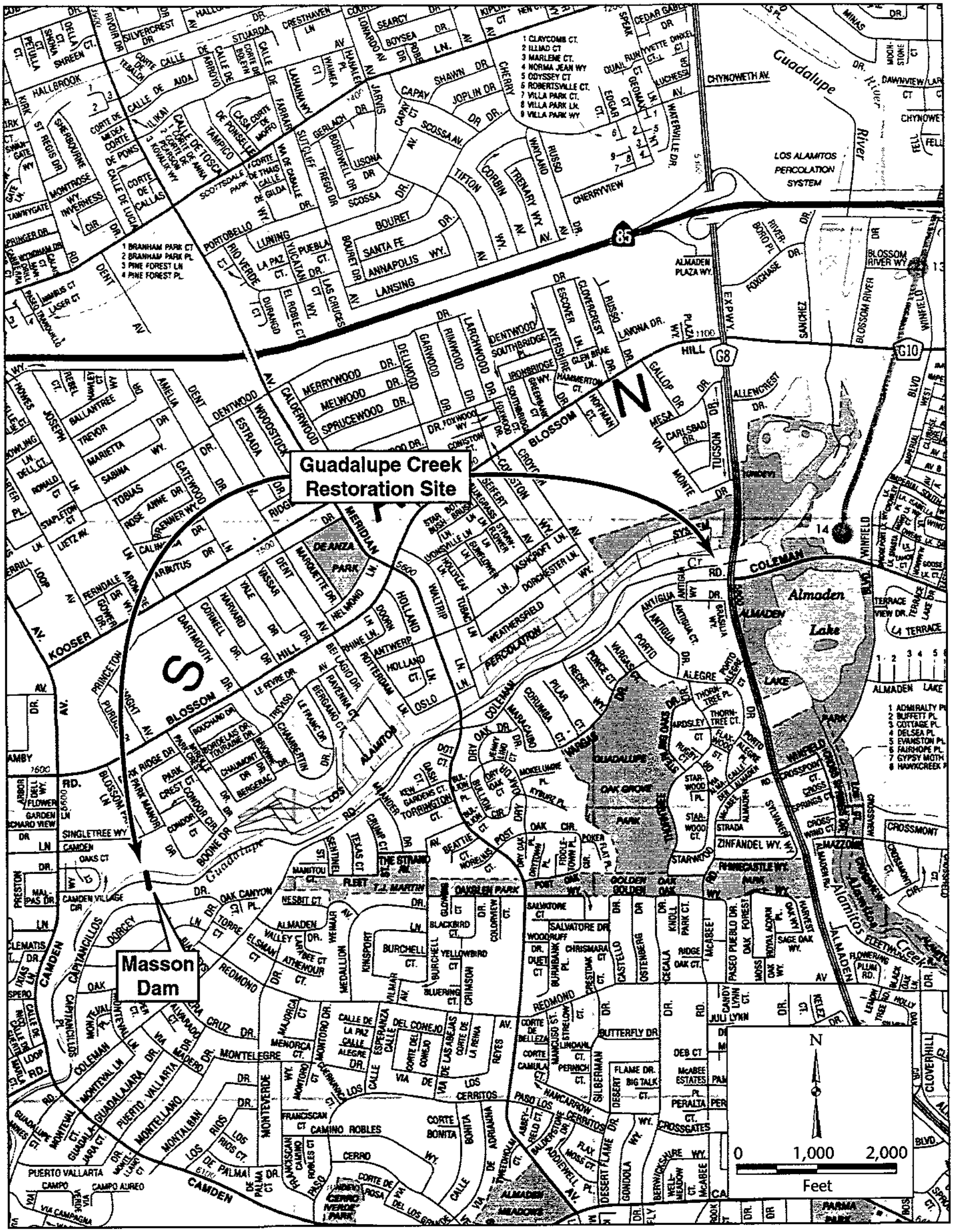
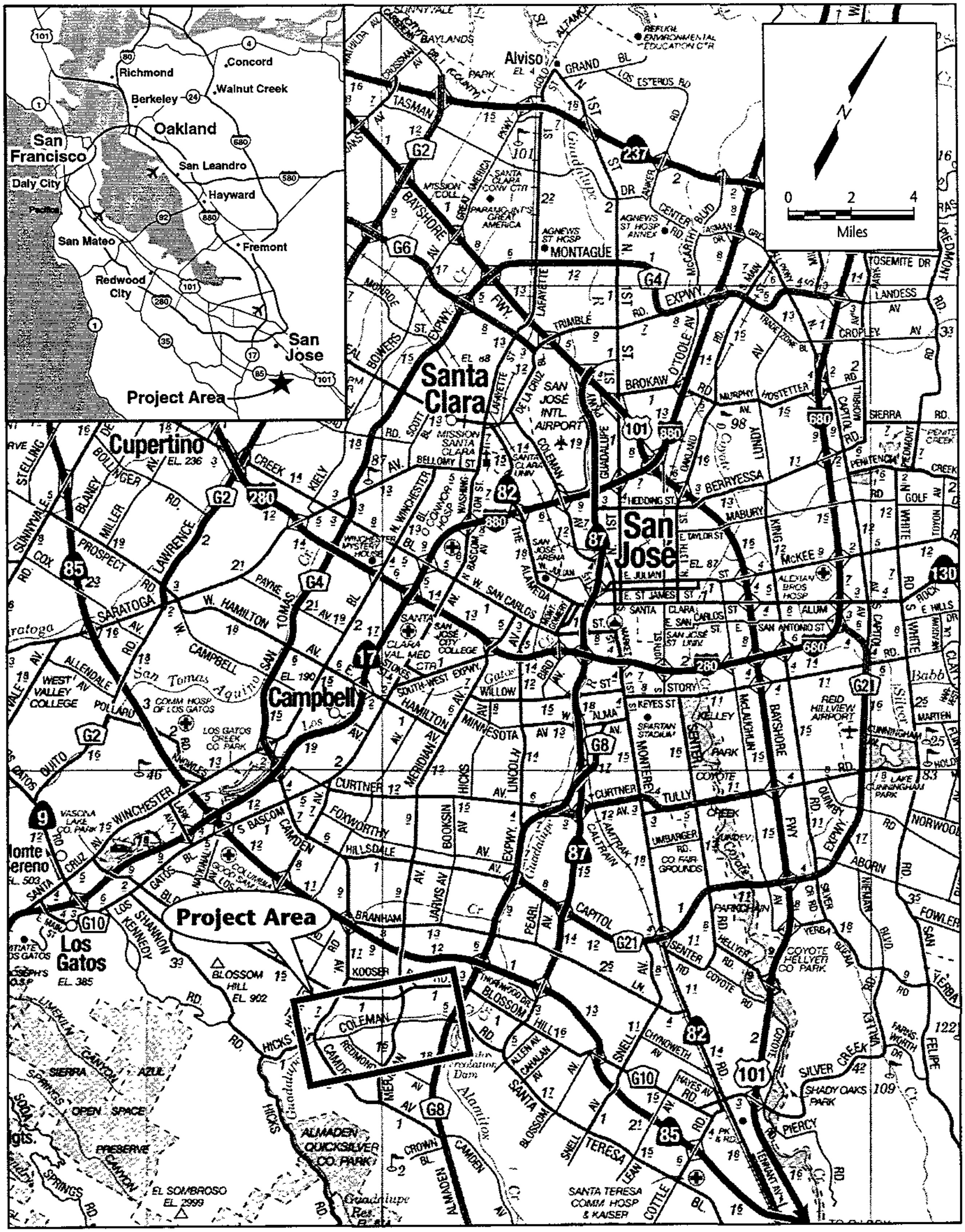


Figure 1c

Location of Guadalupe Creek Restoration Project Site



Jones & Stokes

Figure 2
Regional and Local Transportation Network

The CEQA and NEPA processes for completing environmental documentation are largely parallel. However, there are some minor differences in terminology (Table 1-1). For purposes of brevity, CEQA terminology will be used throughout this EIR/EIS, with the NEPA terminology shown in Table 1-1 incorporated by reference.

Table 1-1. Important CEQA and NEPA Terms

CEQA Term	NEPA Term
Lead Agency	Lead Agency
Responsible Agency	Cooperating Agency
Proposed Project	Proposed Action
No-Project Alternative	No-Action Alternative
Environmentally Superior Alternative	Environmentally Preferable Alternative
Project Objectives	Purpose and Need
Environmental Setting	Affected Environment (Existing Conditions)
Environmental Impacts	Environmental Consequences
Categorical Exemption	Categorical Exclusion
Initial Study	Environmental Assessment
Negative Declaration	Finding of No Significant Impact
Environmental Impact Report	Environmental Impact Statement
Notice of Preparation	Notice of Intent
Notice of Completion	Notice of Availability
Findings	Record of Decision

Both CEQA and NEPA require the evaluation of impacts on specific environmental resources. Impacts are evaluated separately for each resource category; specific resources addressed in this EIR/EIS are discussed below under *Intent and Scope of this Environmental Impact Report/Environmental Impact Study.* Table 1-2 (following page) presents the terminology used to describe the significance level of potential impacts.

Table 1-2. Terms Used to Describe Potential Impacts

Significance Level	Definition
No impact	Implementation and/or operation of the proposed project would result in no change, or would result in a negligible change, in existing conditions with regard to a given resource in the project site and surrounding area.
Less than significant	Implementation and/or operation of the proposed project would not result in a substantial adverse change in existing conditions with regard to a given resource in the project site or surrounding area. Impact requires no mitigation.
Less than significant with mitigation	Implementation and/or operation of the proposed project would not result in a substantial adverse change in existing conditions with regard to a given resource in the project site or surrounding area, if the proposed mitigation is also implemented.
Significant	Implementation and/or operation of the proposed project will result in a substantial and unavoidable adverse change in existing conditions with regard to a given resource in the project site or surrounding area.

1.3 INTENT AND SCOPE OF THIS ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL IMPACT STATEMENT

1.3.1 Intent

The intent of this EIR/EIS is

(1) to identify potential direct, indirect, and cumulative environmental impacts[3] associated with the proposed project,

(2) to describe mitigation measures intended to avoid potentially significant project impacts or reduce them to a less-than-significant level, and

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[3] See *Glossary* for definitions of these and other terms used in this EIR/EIS.

(3) to disclose potential project impacts and proposed mitigation measures for public review and comment.

This EIR/EIS also supplies the information necessary to obtain additional permits and approvals required for implementation of the proposed project (see *Consultation and Other Requirements* below).

1.3.2 Scope

This EIR/EIS describes the features of the proposed project and project alternatives, including the No-Project Alternative, under which current management of the project site would continue and existing conditions would remain generally unchanged. As required by CEQA and NEPA, it evaluates the potential impacts of the proposed project and all project alternatives on the following "resource areas":

- land use and planning,
- biological resources,
- cultural resources,
- hydrology and water quality,
- geology and soils,
- hazardous materials,
- transportation and circulation,
- air quality,
- noise,
- public services and utilities,
- agricultural resources,
- aesthetics, and
- socioeconomics and environmental justice.

The study area addressed in this EIR/EIS includes the project site and surrounding portions of the City of San Jose (City) (Figure 1). For some resource areas (e.g., biological resources, hydrology and water quality), this document also discusses conditions in the larger Guadalupe Creek watershed or Guadalupe River system. The terms *project area* and *project site* are used interchangeably throughout this document to refer to the project reach of Guadalupe Creek and immediately adjacent uplands.

1.4 PUBLIC INVOLVEMENT AND SCOPING

The intent of both CEQA and NEPA is to establish opportunities for the public to review and comment on projects that may affect the environment. Both CEQA and NEPA provide for public participation through:

- project scoping,
- public notice that environmental documents are in preparation (publication of project Notice of Preparation/Notice of Intent),
- public review of environmental documents, and
- public hearings.

CEQA and NEPA also require that a final EIR/EIS include responses to all comments received from the public regarding the draft EIR/EIS. The following sections provide additional information on public involvement in the environmental review process.

1.4.1 Project Scoping

Scoping refers to the process used under both CEQA and NEPA to determine the focus and content of an EIR or EIS. Scoping identifies the range of project alternatives and mitigation measures to be analyzed in depth. Scoping is also helpful in establishing methods of assessment and in selecting the environmental effects to be considered in detail. Tools used in scoping of this EIR/EIS included early public and interagency consultation, public scoping meetings, preparation of the IS/EA, and publication of the project Notice of Preparation (NOP) and Notice of Intent (NOI).

1.4.1.1 Initial Study/Environmental Assessment Scoping Meetings

During the preparation of the project IS/EA, the District held two public scoping meetings to introduce the public and interested organizations to the project and to solicit public input. The meetings were held on February 17, 2000, and April 11, 2000. Public comments received at these meetings were recorded in scoping reports by the District and were considered during project design and the preparation of this EIR/EIS. Issues of concern identified during public scoping meetings for the IS/EA are presented in *Issues of Known Controversy* below.

1.4.1.2 Notice of Preparation and Notice of Intent

The purpose of the NOP and NOI is to solicit participation in determining the scope of an EIR/EIS from responsible and coordinating federal, state, and local agencies and from the public. The lead agencies formally initiated the scoping process for this EIR/EIS in August 2000 by submitting the NOP to the California State Clearinghouse in compliance with CEQA and publishing the NOI in the Federal Register in compliance with NEPA. In addition, a notification letter was distributed to all interested agencies, organizations, and members of the public. The 30-day public scoping period for this document ended October 7, 2000. Issues of concern identified through public scoping are presented in *Issues of Known Controversy* below.

1.4.2 Distribution and Review of this Environmental Impact Report/ Environmental Impact Statement

Upon completion of this draft EIR/EIS, the lead agencies issued a notice announcing the availability of the draft EIR/EIS for a 45-day public review and comment period. During this period, state and federal regulatory agencies will also review the draft. Following the review period, the District and the Corps will collate and address all environmental comments received. The District and the Corps will then prepare a final EIR that incorporates responses to all comments received on the draft EIR/EIS. All agencies and individuals who submit comments on the draft EIR/EIS will receive copies of the final EIR/EIS.

1.5 ISSUES OF KNOWN CONTROVERSY

Scoping for the IS/EA and this EIR/EIS identified several public concerns. Scoping meetings for the IS/EA elicited a range of comments; areas of particular concern included:

- recreation and public access;
- flood protection; and
- physical and ecological functions of the creek corridor, including habitat for special-status species.

Most of the letters received during the scoping period for the EIR/EIS addressed concerns regarding effects related to existing mercury contamination in the project area. The main issues identified fell into three categories:

- human health effects,

- bioaccumulation of mercury in wildlife, and
- methods for transporting contaminated material excavated and removed from the project site.

Restoration of physical and ecological functions of the creek corridor and maintenance of existing flood conveyance capacity are specifically articulated in the objectives for the proposed project (see Chapter 2). This EIR/EIS addresses recreation and public access issues in Section 4.10, human health issues in Section 4.6 , mercury bioaccumulation in Sections 4.2 , and transport of mercury-contaminated materials in Sections 4.4 and 4.6.

1.6 CONSULTATION AND OTHER REQUIREMENTS

1.6.1 Federal Requirements

1.6.1.1 National Environmental Policy Act

The National Environmental Policy Act (42 United States Code [USC] 4321; 40 Code of Federal Regulations [CFR] 1500.1) is the nation's broadest environmental law. NEPA provides an interdisciplinary framework for federal agencies to prevent environmental damage, and contains action-forcing procedures to ensure that federal agency decision makers take environmental factors into account. NEPA applies to all federal agencies and to most of the activities they manage, regulate, or fund that affect the environment. It requires all agencies to consider and to publicly disclose the environmental implications of their proposed actions through the preparation of appropriate documents. The President's Council on Environmental Quality (CEQ) has adopted regulations and other guidance providing detailed procedures that federal agencies must follow to implement NEPA.

This EIR/EIS was prepared to comply with the requirements of NEPA *and relevant* implementing regulations.

1.6.1.2 Endangered Species Act, Sections 7, 9, and 10

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over species listed as threatened or endangered under Section 9 of the Endangered Species Act (ESA). The ESA protects listed species from harm, or *take*. *Take* is broadly defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."

ESA Section 7 requires federal agencies to consult with the Secretary of the Interior through the USFWS and the Secretary of Commerce through National Marine Fisheries Service (NMFS) to ensure that agency projects do not jeopardize the continued existence of endangered or threatened species or destroy or adversely modify critical habitat that supports such species. If a proposed project "may affect" a listed species or designated critical habitat, the lead agency must prepare a biological assessment (BA) to determine whether the effect is "adverse." If the effect is determined to be adverse, USFWS and/or NMFS must prepare a biological opinion. If the project does not jeopardize the continued existence of the species, USFWS may issue an incidental take permit under ESA Section 10, which requires the lead agency to submit a conservation plan addressing project impacts and mitigation measures.

Two federally listed species are known to occur in the project area: steelhead (federally listed as threatened) and chinook salmon (federal candidate species). Moreover, as part of the Central California Coast evolutionarily significant unit (ESU) for steelhead, the segment of Guadalupe Creek downstream of Guadalupe Reservoir has been designated by NMFS as critical habitat for steelhead. Because the proposed project will require the issuance of a permit by the U.S. Army Corps of Engineers, San Francisco District, under Section 404 of the Clean Water Act (CWA; see additional discussion in following paragraphs), the project is considered a federal undertaking and the Corps must comply with Section 7 of the ESA. Accordingly, consultation with NMFS has begun. The potential cost-sharing relationship between the Corps and the District also necessitates Section 7 consultation between the Corps and NMFS.

1.6.1.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) establishes a management system for national marine and estuarine fishery resources. This legislation requires all Federal agencies to consult with the NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect "essential fish habitat" (EFH). EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation states that migratory routes to and from anadromous fish spawning grounds should also be considered EFH. The phrase *adversely affect* refers to any impact that reduces the quality or quantity of EFH. Federal activities that occur outside an area designated as EFH but that may, nonetheless, have an impact on EFH waters and substrate must also be considered in the consultation process. In addition, the Magnuson-Stevens Act requires that consultation consider effects on habitat managed under the Pacific Salmon Fishery Management Plan. The Magnuson-Stevens Act states that consultation regarding EFH should be consolidated, where appropriate, with the interagency consultation, coordination, and environmental review procedures required by other federal statutes. In most cases, the environmental compliance required for federal activities will satisfy consultation requirements under the Magnuson-Stevens Act. EFH consultation requirements can be satisfied through concurrent environmental compliance if the lead agency provides NMFS with timely notification of actions that may adversely affect EFH and if the notification meets requirements for EFH assessments.

The Downtown Project identified the Guadalupe Creek Restoration Project site as a likely offsite mitigation area for impacts of the Downtown Project on SRA habitat. A general description of the proposed project is thus included in the project description for the Downtown Project, and the proposed project's SRA cover elements were included in environmental compliance for the

Downtown Project. Based on a finding by NMFS, the Downtown Project's compliance with the Endangered Species Act (see following section) will suffice as the EFH assessment required by the Magnuson-Stevens Act (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000).

1.6.1.4 Clean Water Act

1.6.1.4.1 Section 303(d). Under CWA Section 303(d), the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards are required to list bodies of water as impaired when the traditional permitting processes for waste discharges have failed to maintain designated water quality objectives and standards. CWA Section 303(d) also requires preparation of a Total Maximum Daily Load (TMDL) program for waters identified by the state as impaired. A TMDL is a quantitative assessment of a problem that affects water quality. A TMDL specifies the allowable load of pollutants from individual sources to ensure compliance with water quality standards. Once the allowable load and existing source loads have been determined, reductions in allowable loads are allocated to the individual pollutant sources.

Parts of the Guadalupe River system (including Guadalupe Creek, Guadalupe Reservoir, Alamitos Creek, and Calero Reservoir; see Figure 1) and the southern part of San Francisco Bay are considered impaired for mercury under CWA Section 303(d), meaning that they contain mercury in unacceptable concentrations. The project area is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (hereafter, RWQCB), which has prepared a draft TMDL program for mercury for San Francisco Bay. The program calls for a significant reduction in the transport of mercury to the Bay by the Guadalupe River system, and establishes a goal of reducing the concentration of mercury in sediments to less than 0.4 milligram per kilogram (mg/kg) total mercury relative to the percentage of material less than 63 micrometers (μm) in diameter.

1.6.1.4.2 Section 404 and 230. Under CWA Section 404, the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (EPA) regulate the discharge of dredged and fill materials into "waters of the United States." *Waters of the United States* include lakes, rivers, streams and their tributaries, as well as wetlands. Wetlands are defined for regulatory purposes as areas "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3, 40 CFR 230.3). Project proponents must obtain a permit from the U.S. Army Corps of Engineers for all discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed action. The U.S. Army Corps of Engineers may either issue individual permits on a case-by-case basis or general permits on a program level.

Discharges to waters of the United States are further regulated under CWA Section 230 (40 CFR 230). Under CWA Section 230.10(a), Section 404 and other permits may be issued only for the "least environmentally damaging" alternative. That is, a proposed discharge may not be permitted if there is a practicable alternative that would have less adverse impacts and lacks other significant adverse consequences.

For regulatory purposes, the project area is under the jurisdiction of the U.S. Army Corps of Engineers, San Francisco District. The District has applied for a Section 404 permit for the proposed project.

1.6.1.4.3 Section 402. CWA Section 402 regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by the EPA. In California, the SWRCB is authorized by the EPA to oversee the NPDES program through the Regional Water Quality Control Boards.

NPDES permits are required for projects that disturb 1 acre or more of land. The NPDES permitting process requires the applicant to file a public notice of intent to discharge stormwater and to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP, pronounced "swip"). The SWPPP includes a site map and a description of proposed construction activities. In addition, it describes the best management practices (BMPs) that will be implemented to prevent soil erosion and discharge of other construction-related pollutants (e.g., petroleum products, solvents, paints, cement) that could contaminate nearby water resources. Permittees are required to conduct annual monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants.

The District will submit a notice of intent to discharge stormwater to the SWRCB. The contractor selected by the District to construct the proposed project will be required to prepare and implement a SWPPP and a monitoring program.

1.6.1.4.4 Section 401. Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in a discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate, or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401.

The District has submitted a written request to the RWQCB for water quality certification, to comply with CWA Section 401. The RWQCB is expected to issue a Section 401 water quality certification for the proposed project in May 2001.

1.6.1.5 Clean Air Act

The Clean Air Act (CAA) of 1970 established national ambient air quality standards (NAAQS) for six pollutants: carbon monoxide (CO), ozone, particulate matter with a diameter less than 10 microns (inhalable particulate matter, PM10), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. Most standards were set to protect public health; however, for some pollutants, standards are based on other values, such as protection of crops, protection of materials, and avoidance of nuisance conditions. Except for ozone, NAAQS represent short-term (24 hours or less) concentrations that may be exceeded no more than once per year and annual concentrations that may never be exceeded. NAAQS for ozone may be exceeded no more than 3 days in 3 years.

Areas that fail to meet NAAQS are called nonattainment areas. The CAA requires states to submit a state implementation plan (SIP) for nonattainment areas. The SIP, which is reviewed and approved by EPA, must delineate proposed methods for attaining NAAQS. States that fail to submit a plan or to secure approval may be denied federal funding and/or required to increase emission offsets for industrial expansion. The 1990 Amendments to the CAA established categories of air pollution severity for nonattainment areas, ranging from "marginal" to "extreme." SIP requirements vary, depending on the degree of pollution severity.

CAA's conformity provisions are designed to ensure that federal agencies contribute to efforts to achieve the NAAQS. EPA has issued two regulations implementing these provisions. The general conformity regulation addresses actions of federal agencies other than the Federal Highway Administration and the Federal Transit Administration. General conformity applies to a wide range of actions or approvals by federal agencies. Projects are subject to general conformity if they exceed emissions thresholds set in the rule and are not specifically exempted by the regulation. Such projects are required to fully offset or mitigate project-related emissions, including both direct emissions and indirect emissions over which the federal agency has some control.

1.6.1.6 National Historic Preservation Act, Section 106

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires federal agencies or agencies for which they provide funding or issue permits to take into account the effects of their actions on cultural resources listed in, or eligible for listing in, the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on these actions.

The Section 106 compliance process has four basic steps.

(1) Identify and evaluate historic properties.

(2) Assess effects of the project on historic properties.

(3) Consult with the State Historic Preservation Officer (SHPO) and other interested parties regarding adverse effects on historic properties, resulting in a memorandum of agreement (MOA).

(4) Proceed in accordance with the MOA.

The proposed project will require the issuance of a permit by the U.S. Army Corps of Engineers, San Francisco District under Section 404 of the CWA; therefore, the project is considered a federal undertaking. As a result, the Corps must comply with Section 106 of NHPA. Consultation with SHPO was completed in July 2000; SHPO concurred with the determination that no historic properties will be affected by implementation of the proposed project (Abeyta pers. comm.).

1.6.1.7 Executive Order 11990, Protection of Wetlands

Executive Order 11990 (May 24, 1977) directs all federal agencies to refrain from assisting or giving financial support to projects that encroach on public or privately owned wetlands.

1.6.1.8 Executive Order 12898, Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." The purpose of the order was to ensure that federal actions and policies do not result in the disproportionate placement of adverse environmental, economic, social, or health impacts on minority and low-income populations. By memorandum on February 11, 1994, the President directed EPA to ensure that agencies analyze environmental impacts (including human health, social, and economic impacts) of proposed projects on minority and low-income communities. This EIR/EIS includes analysis of the socioeconomic and environmental justice impacts of the proposed project (see Chapter 4).

1.6.1.9 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. The MBTA is administered by the USFWS, and sets seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10). It is a strict-liability law that incorporates no requirement to prove intent to violate any of its provisions. Wording in the MBTA makes it clear that most actions that result in "taking" or possession (permanent or temporary) of a protected species can be a violation of the Act. The word *take* is defined as meaning "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10.12). The provisions of the MBTA are nearly absolute; "except as permitted by regulations" is the only exception. Examples of permitted actions that do not violate the law are the possession of a hunting license to pursue specific gamebirds, legitimate research activities, display in zoological gardens, bird-banding, and similar activities (Faanes et al. 1992)

1.6.1.10 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as the Superfund Act) of 1980 (PL96-510) is administered by EPA. It is intended to protect the public and the environment from the effects of prior hazardous waste disposal and new hazardous material spills. CERCLA provides funds to compensate victims and to decontaminate the environment. The Superfund Amendments and Reauthorization Act (SARA) of 1986 (PL-99-499) amends some provisions of CERCLA and provides for a Community Right-to-Know program.

1.6.1.11 Resource Conservation and Recovery Act

The EPA also administers the Resource Conservation and Recovery Act (RCRA) of 1976 (PL 94-580), along with the Hazardous and Solid Waste Amendments (HSWA) of 1984. This legislation provides the principal regulation for the storage, transportation, and disposal of both solid and hazardous waste. RCRA imposes reporting and permitting requirements, and provides for operational control on those who generate, treat, store, transport, or dispose of hazardous waste.

1.6.2 State Requirements

1.6.2.1 California Environmental Quality Act

CEQA (Public Resource Code 21000 et seq.) provides the foundation for environmental law and policy in California. The primary objectives of CEQA are:

- to disclose to decision makers and the public the significant environmental effects of proposed projects;
- to identify ways to avoid or reduce environmental damage;
- to prevent environmental damage by requiring implementation of feasible project alternatives and/or mitigation measures;
- to disclose to the public reasons for agency approval of projects with significant environmental impacts;
- to foster interagency coordination in the review of projects; and
- to enhance public participation in the planning and environmental review process.

CEQA applies to all discretionary activities proposed, implemented, or approved by California public agencies, including state, regional, county, and local agencies, unless a specific exemption applies.

CEQA requires that public agencies comply with both procedural and substantive requirements. Procedural requirements under CEQA include the preparation of appropriate environmental documents, consideration of project alternatives, development of mitigation measures and a mitigation monitoring program. CEQA also specifically provides for public involvement in the review process by requiring public notice of preparation of environmental documents, establishing a public scoping process, and requiring lead agencies to respond to public comments in final environmental documents. CEQA's substantive provisions require agencies to address environmental impacts disclosed in an appropriate document. When avoiding or minimizing environmental damage is not feasible, CEQA requires agencies to prepare a written statement of overriding considerations when they decide to approve a project that will cause one or more significant effects on the environment. CEQA also establishes a series of action-forcing procedures to ensure that agencies accomplish the purposes of the law. In addition, under the direction of CEQA, the California Resources Agency has adopted regulations, known as the state CEQA Guidelines, which provide detailed procedures that agencies must follow to implement the law.

This EIR/EIS was prepared to comply with the requirements of CEQA and the CEQA Guidelines.

1.6.2.2 California Fish and Game Code, Sections 1601–1607 (Lake or Streambed Alteration Agreement Program)

Under Sections 1601–1607 of the California Fish and Game Code, the California Department of Fish and Game (DFG) regulates projects that affect the flow, channel, or banks of natural bodies of water. Project proponents are required to notify and enter into a streambed alteration agreement with DFG before beginning construction of a project that will: (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; (2) use materials from a streambed; or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake. Sections 1601–1607 typically do not apply to drainages that lack a defined bed and banks, such as swales and vernal pools.

The District has submitted a Section 1601 application to DFG for a Lake or Streambed Alteration agreement. It is anticipated that the District will receive an agreement from DFG in May 2001.

1.6.2.3 California Endangered Species Act and Implementing Regulations

The California Endangered Species Act (CESA) protects wildlife and plants listed as threatened and endangered by the California Fish and Game Commission. It is administered by DFG. CESA requires state agencies to seek and conserve threatened and endangered species and thus restricts all persons from taking listed species except under certain circumstances; *take* is defined as any action or attempt to "hunt, pursue, catch, capture, or kill." Section 2080 of the California Fish and Game Code prohibits the take of species listed as threatened or endangered by

DFG. However, under Section 2081, DFG may issue incidental take permits for species that are not designated as "fully protected." The requirements for an application for an incidental take permit are described in Section 2081 and in final adopted regulations for implementing Sections 2080 and 2081.

1.6.2.4 California Air Quality Regulations

State air quality regulations are the responsibility of the California Air Resources Board (CARB), an arm of the California Environmental Protection Agency (Cal-EPA). The California Clean Air Act of 1988 established California ambient air quality standards (CAAQS), which, unlike the federal NAAQS standards, represent concentrations that should never be exceeded. Under the California Clean Air Act, attainment of air quality within the state's individual "air basins" (defined on the basis of topography and air circulation patterns) is the responsibility of local Air Quality Management Districts. The Air Quality Management Districts are required to develop plans and strategies for attaining CAAQS. Santa Clara Valley, including the proposed project site, is located in the southern portion of the San Francisco Bay Area Air Basin (SFBAAB) and is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD).

1.6.2.5 California Hazardous Materials Regulations

Various state regulations govern hazardous materials and hazardous waste management. State hazardous waste regulations are primarily contained in the California Code of Regulations (CCR), Title 22, Division 4, Environmental Health. Of particular relevance to the proposed project are 22 CCR §66261.20 and §66261.24, which establish the threshold limit for total mercury content at 20 mg/kg; material is considered hazardous if its mercury content exceeds this threshold. In addition, the Hazardous Waste Control Law lists hundreds of hazardous and potentially hazardous chemicals, establishes criteria for identifying hazardous materials, regulates the storage, transport, and disposal of hazardous wastes, and identifies hazardous wastes that cannot be disposed of on land. In addition, water quality regulations developed from the Porter-Cologne Water Quality Control Act (see following section) are designed to protect the quality of waters in California; CCR Title 23 contains the water quality regulations pertinent to environmental contamination. In the San Jose area, these state regulations are administered by the RWQCB and the District.

1.6.2.6 Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act of 1975, beneficial uses of California's major rivers and groundwater basins, along with narrative and numerical water quality objectives, are established and periodically reviewed in Water Quality Control Plans (basin plans) (California Regional Water Quality Control Board 1995). CWA assigns the primary responsibility for protecting surface- and groundwater resources from degradation, including oversight of basin plans, to the Regional Water Quality Control Boards. Basin plans are primarily implemented by using the NPDES permitting system to regulate waste discharges.

The RWQCB has not formally designated beneficial uses for Guadalupe Creek. Consequently, water quality in Guadalupe Creek must meet or exceed that necessary to maintain the designated beneficial uses of the Guadalupe River. Existing uses of the Guadalupe River include non-contact recreation and warmwater fish and wildlife habitat; potential uses include contact recreation and migration and spawning of anadromous fish.

1.6.3 Regional and Local Requirements

1.6.3.1 City of San Jose 2020 General Plan

The General Plan (City of San Jose 1994) articulates the City's planning and development policies. It provides a framework for the type, amount, and phasing of development appropriate to the City's social, economic, and environmental goals. Among other challenges, the General Plan seeks to balance the community's need for flood protection with the desire to preserve San Jose's remaining riparian corridors. In particular, the General Plan directs the City to cooperate with the District to improve flood protection facilities. Additional General Plan policies addressing specific resource areas or technical issues are described in the relevant sections below.

1.6.3.1.1 City of San Jose 2020 General Plan Exterior Noise Goals. Jurisdictions within California are required to have noise elements in their general plans. The noise elements are used as planning guides to ensure that noise levels are compatible with adjacent land uses. Most jurisdictions also have noise ordinances, which serve as enforcement mechanisms for controlling noise.

The City has established a range of acceptable noise levels for various land uses. Outside the San Jose International Airport Noise Zone, the General Plan establishes both long- and short-range exterior noise goals. The General Plan recognizes that these goals will not be achieved within the Airport Noise Zone. A day-night average sound level (L_{dn})[4] of 55 dBA (adjusted decibels) or less above reference noise is the long-range goal for transportation noise and the limit for commercial and industrial noise in residential areas. An L_{dn} of 60 dBA or less is acceptable for short-range exterior noise levels. An L_{dn} of 45 dBA or less is the interior noise level standard. The City has identified an L_{dn} of 76 dBA as the maximum allowable exterior noise level, to avoid significant adverse health impacts on residents.

1.6.3.2 City of San Jose Tree Ordinance

The City's Tree Ordinance protects trees with a diameter at breast height (dbh) greater than 18 inches. These trees are considered *ordinance trees*. *Heritage trees* are ordinance trees that have been "found by the City Council to have a special significance to the community" because of their history, girth, height, species, unique quality, or other factors (San Jose Code Chapter 13.28). However, because all of the Guadalupe Creek restoration project site is located on land currently owned by the District, a City tree removal permit will not be required.

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[4] Appendix B contains brief definitions of acoustics terminology used in this section and in Chapter 4.

1.6.3.3 City of San Jose Hazardous Materials Handling and Storage Ordinance

The City has adopted a municipal Hazardous Materials Handling and Storage Ordinance (HMSO) addressing the proper storage of hazardous materials in underground tanks. The HMSO defines materials requiring regulation, sets standards for existing facilities and the closure of out-of-service facilities, and establishes criteria for reportable discharges. In addition, the HMSO establishes a system of inspections and permitting and requires qualifying facilities to prepare a Hazardous Materials Management Plan (HMMP) and a Hazardous Materials Inventory Statement (HMIS). The HMSO regulates both new and existing facilities. The San Jose Fire Department is the administering agency for the HMSO.

1.7 OTHER PERTINENT STUDIES AND DOCUMENTS

1.7.1 Draft General Re-Evaluation and Environmental Report for Proposed Project Modifications, Guadalupe River Project, Downtown San Jose

The Downtown Project is designed to provide a 100-year level of flood protection while avoiding, minimizing, or mitigating adverse project impacts on habitat for threatened and endangered fish and wildlife species. The Downtown Project was originally authorized by Congress in 1986 to provide flood protection for portions of the City. It was amended in 1990 and 1991 to improve environmental protection and incorporate features for recreation. Phased construction of the Downtown Project began in 1992.

The Corps (lead federal agency) and the District (lead state agency) are currently preparing an Integrated General Re-Evaluation Report/Environmental Impact Report/Supplemental Environmental Impact Statement (GRR/EIR/SEIS) that addresses proposed modifications to the Downtown Project (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). These modifications include flood protection, recreation, and related mitigation measures along the Guadalupe River and at two offsite mitigation areas, including the Guadalupe Creek Restoration Project site.[5] The Downtown Project GRR/EIR/SEIS evaluates potential direct and indirect environmental, social, and economic effects of the proposed modifications and alternatives. Environmental compliance for the Downtown Project is expected to be complete in March 2001.

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[5] The proposed project site was identified as suitable for SRA mitigation for Downtown Project impacts, although the proposed project is separate from the Downtown Project and will be implemented even if the Downtown Project is not realized.

1.7.2 Guadalupe River Project Mitigation and Monitoring Plan

Conditions of the Downtown Project water quality certification issued by the SWRCB (1992, revised 1993) under CWA Section 401 required the Corps and the District to prepare a mitigation and monitoring plan (MMP) for the Downtown Project. This MMP superseded the 1992 Downtown Project MMP (U.S. Army Corps of Engineers 1992). It was prepared by a team of representatives from the Corps, the District, USFWS, NMFS, DFG, and private interest and environmental groups represented by the Natural Heritage Institute (NHI). The Downtown Project MMP includes: a discussion of the potential effects of the Downtown Project; measures to mitigate those effects; related measurable objectives; and adaptive management measures. It also identifies the specific responsibilities of the various project partners for implementing the mitigation program and details the monitoring and reporting requirements for the mitigation program.

1.7.3 Guadalupe River Project Biological Assessments

1.7.3.1 NMFS Biological Data Report/Biological Assessment (January 2000)

In accordance with Section 7 of the ESA, the Corps (the federal lead agency for construction of the Downtown Project) prepared a BA for the Downtown Project and submitted it to NMFS for review (U.S. Army Corps of Engineers 2000a). The NMFS BA evaluated the potential effects of the Downtown Project on fish species listed or proposed for federal listing as threatened or endangered. The species of concern in the Downtown Project area are steelhead and chinook salmon. After reviewing the BA submitted by the Corps, NMFS issued a biological opinion (National Marine Fisheries Service 2000) that specified the following "reasonable and prudent measures" for minimizing incidental take of steelhead:

1. Avoid and minimize bank and instream construction impacts on the Guadalupe River ecosystem.

2. Minimize the extent of temporary and permanent changes to instream and riparian habitat and ensure that proposed mitigation measures used to replace these losses meet identified measurable objectives (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000).

3. Use a fisheries biologist for the purposes of monitoring the affected area, and for removing and relocating steelhead from the affected area.

4. Implement adequate control measures to avoid or minimize sediment, turbidity and pollutant inputs to the Guadalupe River.

5. Prepare and submit monitoring reports annually to document status of construction as well as mitigation activities and performance.

The biological opinion issued by NMFS also included detailed terms and conditions to implement these measures.

The Downtown Project identified the Guadalupe Creek Restoration Project site as a likely offsite mitigation area for impacts of the Downtown Project on SRA habitat. A general description of the proposed project is thus included in the project description for the Downtown Project, and the proposed project's SRA cover elements were included in environmental compliance for the Downtown Project, including the Downtown Project's NMFS BA. The Downtown Project BA described the proposed project in more general terms than the detailed description of alternatives presented in this EIR/EIS, but provided sufficient detail on all potential restoration plans to permit NMFS to assess the impacts of the proposed project on federally listed fish and wildlife species in the proposed project area. Thus, a separate BA is not required for the proposed project.[6]

1.7.3.2 USFWS Biological Data Report/Biological Assessment (February 2000)

In accordance with Section 7 of the ESA, the Corps (the federal lead agency for construction of the Downtown Project) prepared a BA for the Downtown Project and submitted it to USFWS for review (U.S. Army Corps of Engineers 2000b). The USFWS BA analyzed the potential effects of the Downtown Project on the California red-legged frog, and its potential indirect effects on western snowy plover, California clapper rail, and salt marsh harvest mouse. After reviewing the BA submitted by the Corps, USFWS issued a biological opinion (U.S. Fish and Wildlife Service 2000) stating that implementation of the Downtown Project as proposed is not likely to adversely affect the California red-legged frog, salt marsh harvest mouse, or California clapper rail, and specifying conservation measures to minimize and avoid impacts on western snowy plover.[7]

The Downtown Project identified the Guadalupe Creek Restoration Project site as a likely offsite mitigation area for impacts of the Downtown Project on SRA habitat. A general description of the proposed project is thus included in the project description for the Downtown Project, and the proposed project's SRA cover elements were included in environmental compliance for the Downtown Project, including the Downtown Project's NMFS BA. The Downtown Project BA described the proposed project in more general terms than the detailed description of alternatives presented in this EIR/EIS, but provided sufficient detail on all potential restoration plans to permit NMFS to assess the impacts of the proposed project on federally listed fish and wildlife species in the proposed project area. Thus, a separate BA is not required for the proposed project.[8]

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[6] The proposed project's compliance with ESA will be reviewed and confirmed (1) when the U.S. Army Corps of Engineers, San Francisco District, consults with USFWS and NMFS before issuing the CWA Section 404 permit required for the District to construct the project, and (2) when the RWQCB and SWRCB consult with NMFS and USFWS before issuing the CWA Section 401 water quality certification for the proposed project.

[7] Western snowy plovers are not known to use any habitat in the proposed project area.

[8] The proposed project's compliance with ESA will be reviewed and confirmed (1) when the U.S. Army Corps of Engineers, San Francisco District, consults with USFWS and NMFS before issuing the CWA Section 404 permit required for the District to construct the project, and (2) when the RWQCB and SWRCB consult with NMFS and

1.8 REPORT ORGANIZATION

In addition to the Summary at the beginning of the report and this introductory chapter, this EIR/EIS contains the following chapters and sections:

- **Chapter 2. Proposed Project and Alternatives**—describes the proposed project (including project location and objectives), alternatives to the proposed project (including the No-Project Alternative) evaluated in this EIR/EIS, and project alternatives considered but eliminated from detailed study. This chapter also provides a summary comparison of the alternatives and identifies the environmentally superior alternative.

- **Chapter 3. Environmental Setting**—describes existing environmental conditions in and surrounding the project area.

- **Chapter 4. Environmental Impacts and Mitigation Measures**—presents qualitative and quantitative evaluations of potential impacts on the environment as a result of implementing the proposed project and identifies mitigation to avoid or minimize potentially significant impacts.

- **Chapter 5. Cumulative Impacts and Other Required Analyses**—presents a qualitative description of potential impacts on the environment from the incremental implementation of the proposed project and alternatives in combination with implementation of other closely related past, present, and future projects in the Guadalupe River watershed area. This chapter also addresses: the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity; irreversible or irretrievable commitments of resources; growth-inducing impacts; and the environmentally superior alternative.

- **Chapter 6. Document Recipients**—includes a list of agencies, organizations, and individuals who received a review copy of the draft EIR/EIS.

- **Chapter 7. List of Preparers**—includes a list of individuals and organizations who contributed to the preparation of this EIR/EIS.

- **Chapter 8. References**—lists printed references and personal communications used in the preparation of this EIR/EIS.

- **Mitigation and Monitoring Plan**

- **Glossary**

USFWS before issuing the CWA Section 401 water quality certification for the proposed project.

- **Index**
- **Acronyms and Abbreviations** (foldout)
- **Appendix A**—contains additional information on special-status species and sensitive natural communities, including a list of special-status species with the potential to occur on the project site.
- **Appendix B**—contains additional information on environmental acoustics.
- **Appendix C**—contains information on species known or thought to occur in the project area, and their typical habitats.
- **Appendix D**—contains public and agency comments and responses to comments.

Chapter 2. Proposed Project and Alternatives

2.1 INTRODUCTION

The purpose of this chapter is:

- to describe the alternatives development process and the alternatives evaluated during the planning and environmental analysis conducted for the Guadalupe Creek Restoration Project, and
- to present the proposed project (Preferred Alternative).

This information forms the basis for the evaluation of potential project impacts required by CEQA and NEPA.

2.2 PROJECT LOCATION

Guadalupe Creek is located in the southwestern portion of the City of San Jose (the City) in Santa Clara County (the County). The project area for resources evaluated in this document encompasses approximately 1.7 miles of lower Guadalupe Creek between Masson Dam and Almaden Expressway. The project area is bordered on the north by residential development and the Los Capitancillos percolation pond system, and on the south by Coleman Road (Figure 1, Figure 2).

Based on key geomorphic characteristics and changes in channel morphology the project site is divided into four distinct geomorphic reaches: Reach 1, Reach 2, Reach 3, and Reach 4 (Figure 3). The following sections describe the geomorphic characteristics, land use constraints, and other features associated with each reach.

2.2.1 Reach 1

Reach 1 is 3,280 feet long and is located at the downstream end of the project area (Figure 3). It extends from Almaden Expressway to approximately 1,000 feet below the Meridian Avenue Bridge. Reach 1 is characterized by large, alternating gravel bars that create a broad channel bottom. A wide floodplain bench extends along much of the north bank between the top of the channel bank and the maintenance road levee that borders the Los Capitancillos percolation pond system. Along the south side of Reach 1, the channel bank rises steeply from the channel bed to Coleman Road. Much of the south bank along Coleman Road is armored by concrete slope protection, which has been undercut by the creek in some areas. Vegetation in Reach 1 consists primarily of emergent vegetation along the waterline, and non-native annual grasses and forbs on the channel banks and upper floodplain terraces. Isolated stands of sycamores, oaks, and native and non-native shrubs are also found within the reach.

2.2.2 Reach 2

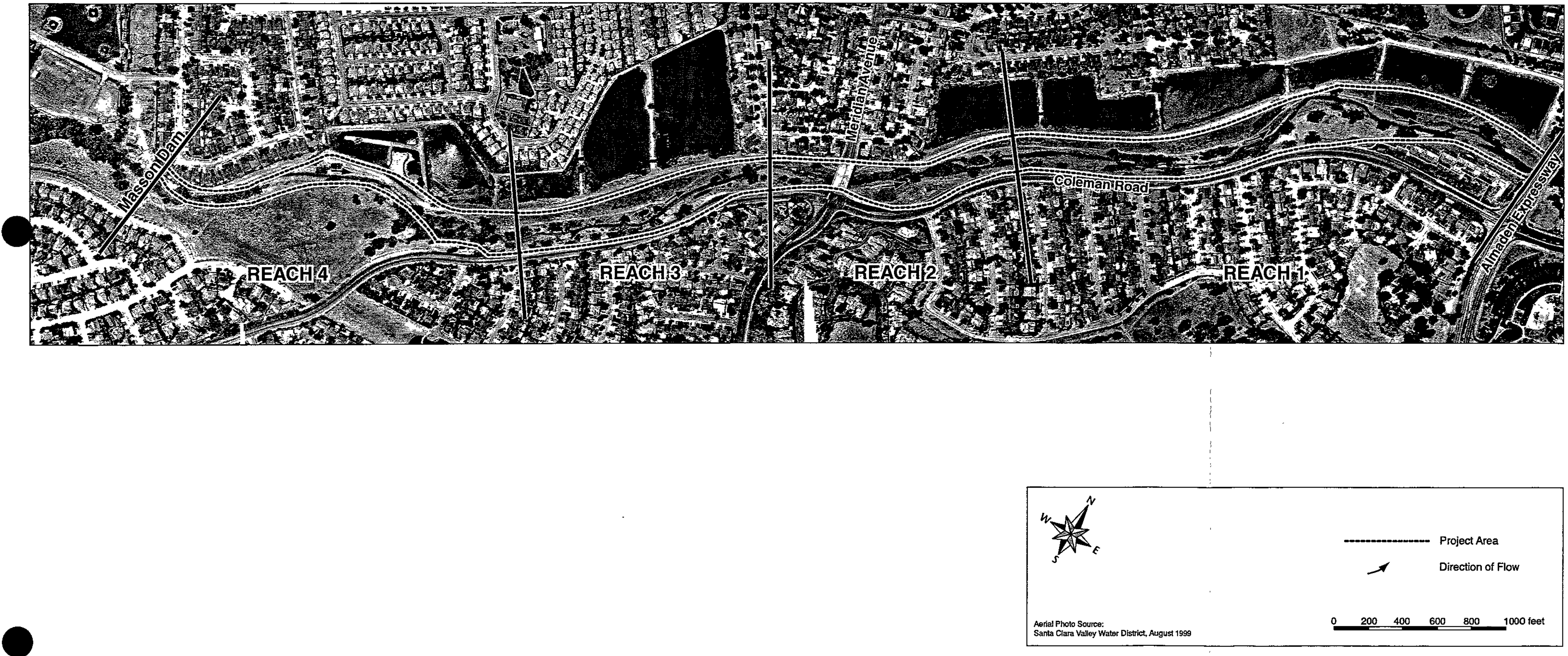
Reach 2 is 1,460 feet long and spans a short section of the project area from the upstream end of Reach 1 to a point upstream of the Meridian Avenue Bridge (Figure 3). The creek channel in Reach 2 is relatively narrow with no large gravel bars and only a few small intermediate-level floodplain benches. The flood corridor narrows to a width of about 150 feet where the creek passes between the maintenance road levee and Coleman Road immediately upstream of the Meridian Avenue Bridge. Vegetation in Reach 2 is characterized by dense stands of willows and isolated mature sycamores. The higher floodplain terraces are dominated by non-native annual grasses and forbs.

2.2.3 Reach 3

Reach 3 is 1,500 feet long and extends from Reach 2 upstream to a dense stand of riparian vegetation (Figure 3). The north side of the creek is characterized by a very wide floodplain bench that extends along the entire reach. Along the south side of Reach 3, the channel bank rises steeply from the channel bed to Coleman Road. Sinuosity is low in Reach 3, and the channel is generally narrower and more entrenched than in Reaches 1 and 2. There are few well-developed gravel bars in Reach 3. Vegetation in Reach 3 consists primarily of willows and alders along the water's edge and non-native annual grasses and forbs on the upper floodplain terraces. Six large sycamores are located along the creek's north bank. Because of previous floodplain modifications in this reach, these trees are isolated on raised mounds that are as much as 5 feet higher than the surrounding floodplain terraces.

2.2.4 Reach 4

Reach 4 is 2,400 feet long and is located at the upstream end of the project area, immediately downstream of Masson Dam (Figure 3). The channel in Reach 4 is deeply entrenched and relatively narrow, and is more confined than in the other reaches. Reach 4 has a few small intermediate-level floodplain benches, but along most of the reach the channel banks are steep-sided. In the upstream portion of Reach 4, the creek is bordered by a high terrace on the south bank (the Los Capitancillos



Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 3
Delineation of Geomorphic Reaches in Guadalupe Creek Project Area

Freshwater Wetland Project Site) and by the maintenance road and percolation ponds on the north bank. Sinuosity in the upstream portion of the reach is very low, with few well-developed bar surfaces. Near the downstream end of Reach 4, the channel bends sharply toward Coleman Road, becomes more sinuous, and enters an area of dense riparian vegetation. Reach 4 exhibits more abundant tree cover along the riparian corridor than any of the other reaches. Vegetation consists of alders, cottonwoods, and willows along the waterline, and sycamores, coast live oaks, and elderberry shrubs on the upper terraces.

2.3 ALTERNATIVES DEVELOPMENT

The development and evaluation of project alternatives are the basis of the environmental analysis process required by both CEQA and NEPA. The state CEQA Guidelines (Section 15126.6) require that an EIR describe and evaluate the comparative merits of a reasonable range of project alternatives, or of alternative project locations, that could easily attain the basic objectives of the project. The CEQA Guidelines further require that this discussion focus on alternatives capable of eliminating significant adverse impacts of the proposed project, and that analysis include the No-Project Alternative. Under NEPA, the range of alternatives required in an EIS is governed by "rule of reason". Alternatives that do not meet the project's stated purpose and need, or do not satisfy the lead agency's criteria with regard to economic feasibility, environmental considerations, and technical feasibility, need not be evaluated in the project EIS. Like CEQA, NEPA requires the lead agency to assess the No-Action Alternative in addition to reasonable alternatives.

The development of the alternatives evaluated in this document was based on an extensive and thorough screening process. During the project planning phase, project objectives were articulated to guide the development of project alternatives and to screen out possible alternatives that fell outside of the "reasonable" range. Selection of practicable alternatives was based on an assessment of (1) their ability to meet stated project objectives; (2) their potential long-term environmental, economic, and social impacts; and (3) (pursuant to CEQA and NEPA requirements) future conditions in the absence of any action. In addition, issues and concerns raised during the scoping process by various resource and regulatory agencies and other interested parties and individuals were considered in the development and evaluation of alternatives.

2.3.1 Project Objectives

The objectives of the Guadalupe Creek Restoration Project were developed in phases during a series of meetings involving the District and project stakeholders. A preliminary set of project objectives was presented to the public at an open house held on February 17, 2000. After a thorough review of comments received at the open house, the project objectives were refined and a final set of primary and secondary objectives was articulated to guide the development and evaluation of alternatives.

2.3.1.1 Primary Objective

The primary objective of the project is to restore SRA cover vegetation and improve aquatic habitat for anadromous fish (e.g., steelhead) in lower Guadalupe Creek between Almaden Expressway and Masson Dam. Restoring SRA cover vegetation and improving aquatic habitat will create and maintain suitable water temperatures, increase instream organic material (leaf and insect drop), and provide habitat to support all life stages of anadromous fish.

2.3.1.2 Secondary Objectives

Secondary project objectives represent key physical, ecological, regulatory, and societal benefits other than the project's primary objective that may be achieved through project implementation. Expected success in achieving secondary project objectives was used to evaluate potential project alternatives and to identify alternatives for detailed consideration in this document. The project's secondary objectives are:

- to create 5,971 linear feet (lf) of SRA cover vegetation that may serve as offsite mitigation for impacts of the Guadalupe River Flood Protection Project;
- to create riparian habitat, including SRA cover vegetation, that may provide mitigation credit for future District projects, or may represent "enhancement opportunities" resulting in a net increase in biological resources in the project area, consistent with District policy;
- to enhance habitat for other special-status species along the project reach of Guadalupe Creek;
- to restore physical processes and ecological functions along the project reach of Guadalupe Creek;
- to protect existing infrastructure in the project area;
- to maintain existing flood conveyance capacity;
- to minimize impacts on existing resources;
- to improve recharge of groundwater aquifers;
- to minimize long-term operations and maintenance requirements;
- to minimize impacts on existing water management operations;

- to strive to meet regional planning objectives as outlined in relevant regional planning documents; and

- not to preclude future recreation uses that are compatible with other project objectives.

2.3.2 Alternatives Considered but Eliminated

During the planning process several alternatives were considered but were rejected because they appeared to be infeasible, they were associated with potentially significant adverse environmental impacts, or they did not have the potential to adequately meet the project objectives. The following sections briefly describe the alternatives eliminated from further consideration.

2.3.2.1 Offsite Alternatives

Potential restoration sites other than the proposed project site were not evaluated in this document because an offsite alternative would not meet the primary goal of restoring habitat in lower Guadalupe Creek between Almaden Expressway and Masson Dam.

2.3.2.2 No-Excavation Alternative

This alternative would involve creating SRA cover by planting riparian vegetation on existing channel bank and floodplain surfaces and installing structures (rootwads and other instream woody material, stream barbs, boulders, and v-weirs)[1] to provide instream cover for fish and to create pools. Under this alternative, the existing stream channel geometry and hydraulic function, including vertical banks and high terrace and upland surfaces, would be maintained. Planting would occur primarily along the tops of channel banks. In addition, because of the high vertical banks a greater proportion of mesic and xeric species such as oaks (*Quercus* spp.) would be planted.

This alternative was eliminated from further consideration because it would not meet the primary project objective of creating anadromous fish habitat. Planting existing high terrace and upland surfaces would not shade a significant portion of channel bank and stream surfaces and thus would not reduce summer water temperatures sufficiently to create rearing habitat suitable for anadromous fish. Moreover, the establishment and long-term viability of plantings would be limited by existing soil conditions, depth to groundwater, and isolation from the active floodplain.

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[1] Refer to *Channel and Floodplain Modification Alternative (Preferred Alternative/Proposed Project)* section for descriptions of instream structures.

2.3.2.3 Elevated Channel Bed Alternative

This alternative would involve restoring the channel bed to a level consistent with elevations recorded prior to implementation of the downstream Guadalupe Creek flood control project in the 1970s. Under this alternative, rock and other material would be added to the channel bed and lower banks, and grade control structures would be constructed to restrict downstream transport of new material. The existing stream channel hydraulic geometry, including vertical banks, and high terrace and upland surfaces, would be maintained. Because raising the channel bed would elevate surface water levels relative to existing surfaces, planting would extend beyond the top of the channel banks onto existing floodplain surfaces. This alternative was eliminated from further consideration because it would result in substantial adverse environmental effects on existing riparian vegetation and instream aquatic habitat. In addition, this alternative would substantially reduce the creek's flood conveyance capacity and increase flood hazards for adjacent property owners.

2.3.3 Alternatives Evaluated in this EIR/EIS

The planning phase of the Guadalupe Creek Restoration Project incorporated an extensive restoration design, environmental planning, and regulatory compliance review process. This process was a cooperative effort involving:

- the lead agencies,
- concerned members of the public, and
- federal and state resource and regulatory agencies, including USFWS, NMFS, DFG, and the RWQCB.

During this iterative process, an array of alternative plans for restoring SRA cover vegetation and improving aquatic habitat on the project site was considered. The majority of these alternatives were eliminated from detailed review and analysis during preliminary screening (see discussion in preceding section) because they did not meet the project objectives or would result in significant adverse affects on the environment.

Analysis conducted during the preparation of this EIR/EIS showed that implementation of the proposed project with all proposed mitigation would not result in any significant adverse affects on the environment, based on CEQA and NEPA criteria. This EIR/EIS identifies several potentially significant impacts, all of which would be reduced to less-than-significant levels by the implementation of mitigation included in the proposed project. This EIR/EIS also identifies several less-than-significant impacts. Some of the potentially significant impacts could also be reduced by adopting alternatives to the proposed project.

The following sections present the four project alternatives developed for the Guadalupe Creek Restoration Project, including the proposed project. These include:

- Proposed Project (Preferred Alternative)—Channel and Floodplain Modification,
- Alternative 1—Reduced Channel and Floodplain Modification,
- Alternative 2—Minimal Channel and Floodplain Modification, and
- Alternative 3—No-Project Alternative.

2.4 PROPOSED PROJECT AND ALTERNATIVES

2.4.1 Channel and Floodplain Modification Alternative (Preferred Alternative/Proposed Project)

The Channel and Floodplain Modification Alternative (proposed project) emphasizes modifying channel and floodplain surfaces via channel relocation, floodplain development, and bank stabilization to enhance instream habitat and create conditions suitable for the establishment and long-term viability of SRA vegetation (Figures 4–7, Figure 8). Under the proposed project, floodplain excavation would extend beyond the 15-foot planting zone (relative to the low-flow channel) to compensate for reduction in flood conveyance capacity associated with planting riparian vegetation. Implementation of the proposed project would involve shifting approximately 2,500 lf of existing stream channel, excavating and removing approximately 42,000 cubic yards of material, and importing 13,000 cubic yards of material to create suitable planting sites. In addition, approximately 725 lf of bank protection features would be installed, and approximately 6 acres of riparian vegetation and approximately 13,000 lf of SRA cover vegetation would be established under the proposed project. Specific project features associated with the proposed project are described below on a reach-specific basis. Figure 3 shows the four reaches identified within the project site.

2.4.1.1 Reach 1, Proposed Project

In Reach 1, the proposed project will emphasize planting existing surfaces, including bars, and minimizing physical modifications to the channel and floodplain (Figure 4). However, portions of the existing channel will be shifted to create new floodplain surfaces for planting along Coleman Road and to protect the maintenance road levee from further erosion.

Instream structures—e.g., rootwads and other instream woody material (IWM), stream barbs, boulders, and v-weirs—will be incorporated into the channel bed and banks to control existing erosion, narrow the low-flow channel, provide cover and instream habitat for fish, and improve hydraulic diversity while maintaining the low sinuosity of the existing planform. Rootwads, barbs, and similar features will also be used to stabilize the bench along Coleman Road and to provide instream cover for fish.

The planting program for Reach 1 will emphasize planting sycamores and other riparian vegetation on floodplain and bar surfaces to create a strip of riparian vegetation along the north bank, and to fill gaps in the existing riparian canopy. The bench at the toe of the slope along Coleman Road will also be planted with riparian species. Oak woodland species will be planted at relatively low elevations where soils are coarse and permeable and contain less moisture. Immediately upstream from the Almaden Expressway Bridge, planting areas will be tapered to ensure that the bridge opening is unobstructed, and existing access to the bridge will be maintained to facilitate maintenance activities.

2.4.1.2 Reach 2, Proposed Project

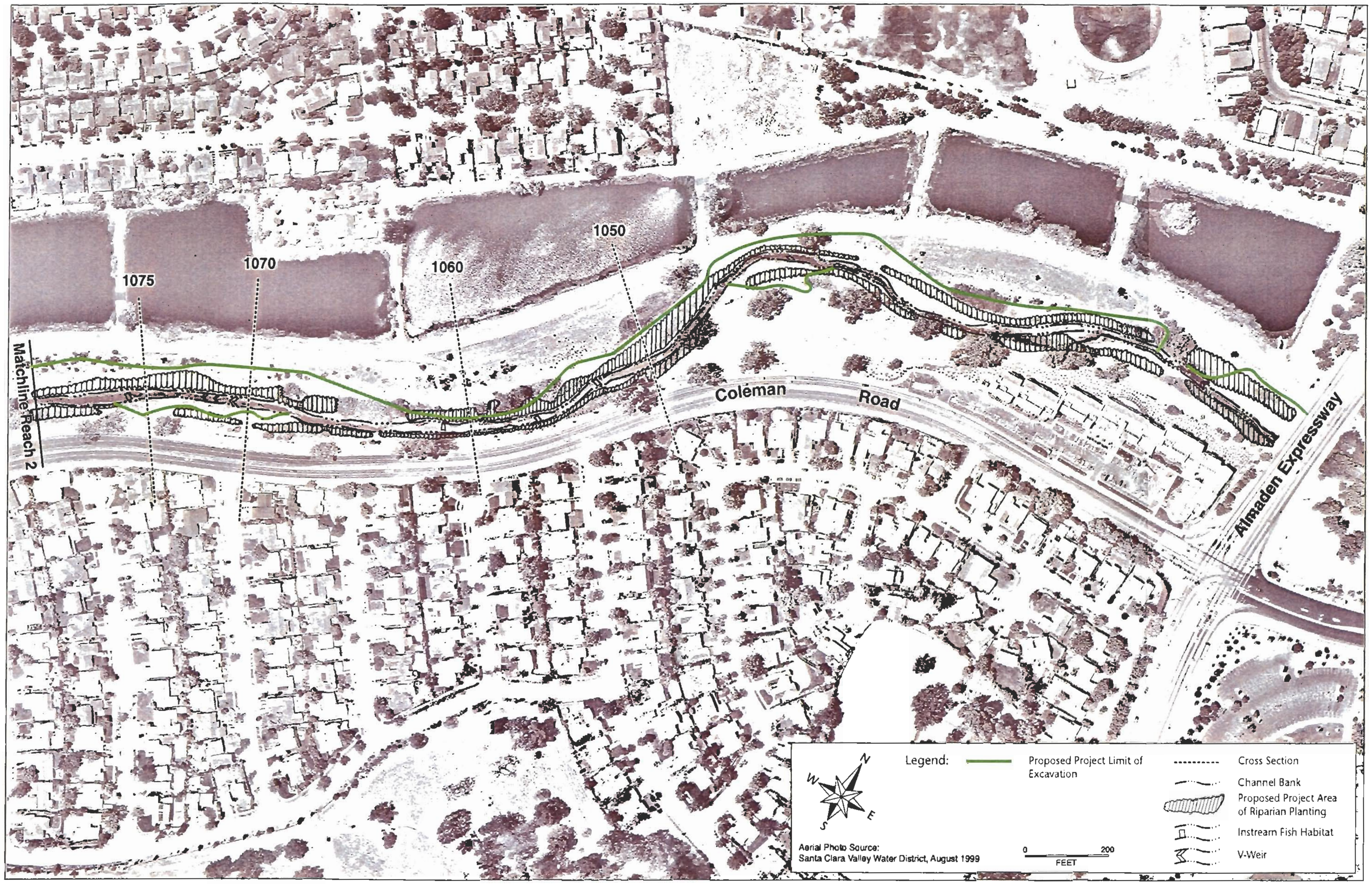
The existing planform of the creek will generally be maintained in Reach 2 (Figure 5). Minor modifications will be made to lower floodplains in most areas, except downstream from the Meridian Avenue Bridge, where more extensive excavation will expand the floodplain on the parcel owned by the City. This expansion will reduce the flow velocity in the main channel while preserving a band of willows along the south bank. An existing sycamore tree at the top of the bank will be removed to allow for the expansion of the floodplain. An existing oak in the same area may also be removed.

Instream structures will also be installed in Reach 2. IWM will be used to improve bank stability, to increase instream cover, and to increase channel complexity and hydraulic diversity in the low-flow channel. Bank stabilization structures will be used on the bend upstream from Meridian Avenue to protect the maintenance road and improve instream cover. Near the downstream end of Reach 2, bank stabilization measures will be installed at the toe of the bank adjacent to Coleman Road.

Planting in Reach 2 will include establishing riparian vegetation on the lower floodplain surfaces and higher slopes and terraces. Immediately upstream and downstream from the Meridian Avenue Bridge, the planting areas will be tapered to ensure that the bridge opening is unobstructed. Sycamore woodland species will be planted on the north side of the creek immediately upstream from the bridge to ensure that the plantings do not impede floodflows.

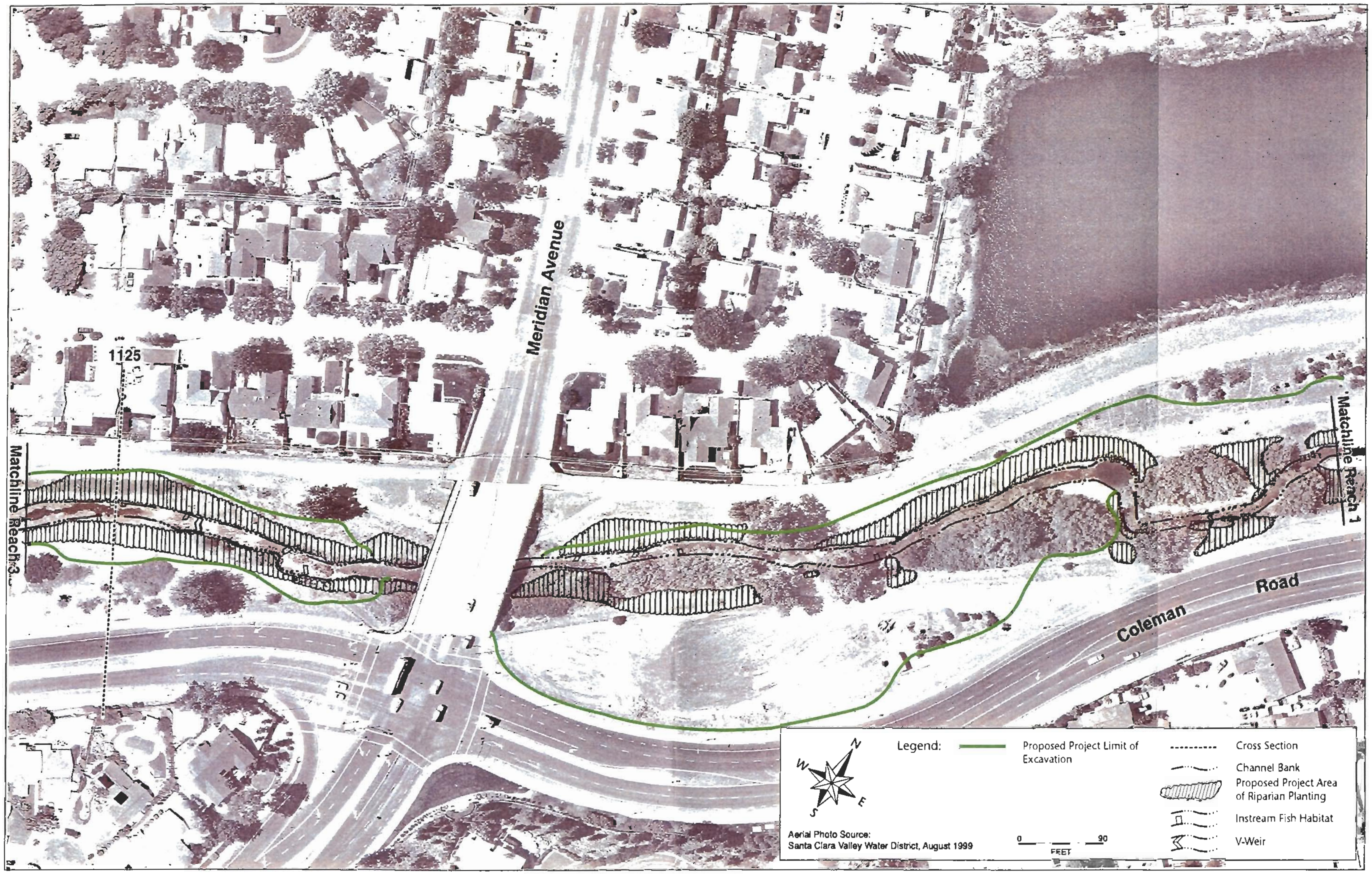
2.4.1.3 Reach 3, Proposed Project

Project features proposed for Reach 3 will focus on modifying the existing channel and floodplain to reduce the level of entrenchment, providing planting surfaces for riparian vegetation, and increasing hydraulic diversity in the channel (Figure 6). Near the downstream end of the reach, modifications will be made to the channel planform to extend the floodplain and increase channel complexity and hydraulic diversity. These modifications will generally follow the same meander pattern that now exists in the upstream portion of the reach. Channel realignment will significantly expand the area suitable for planting riparian vegetation. Two mature sycamores, located on artificially created mounds and isolated from the active floodplain, will be removed to create additional floodplain surfaces to reduce channel velocities. IWM will be added to stabilize the bed



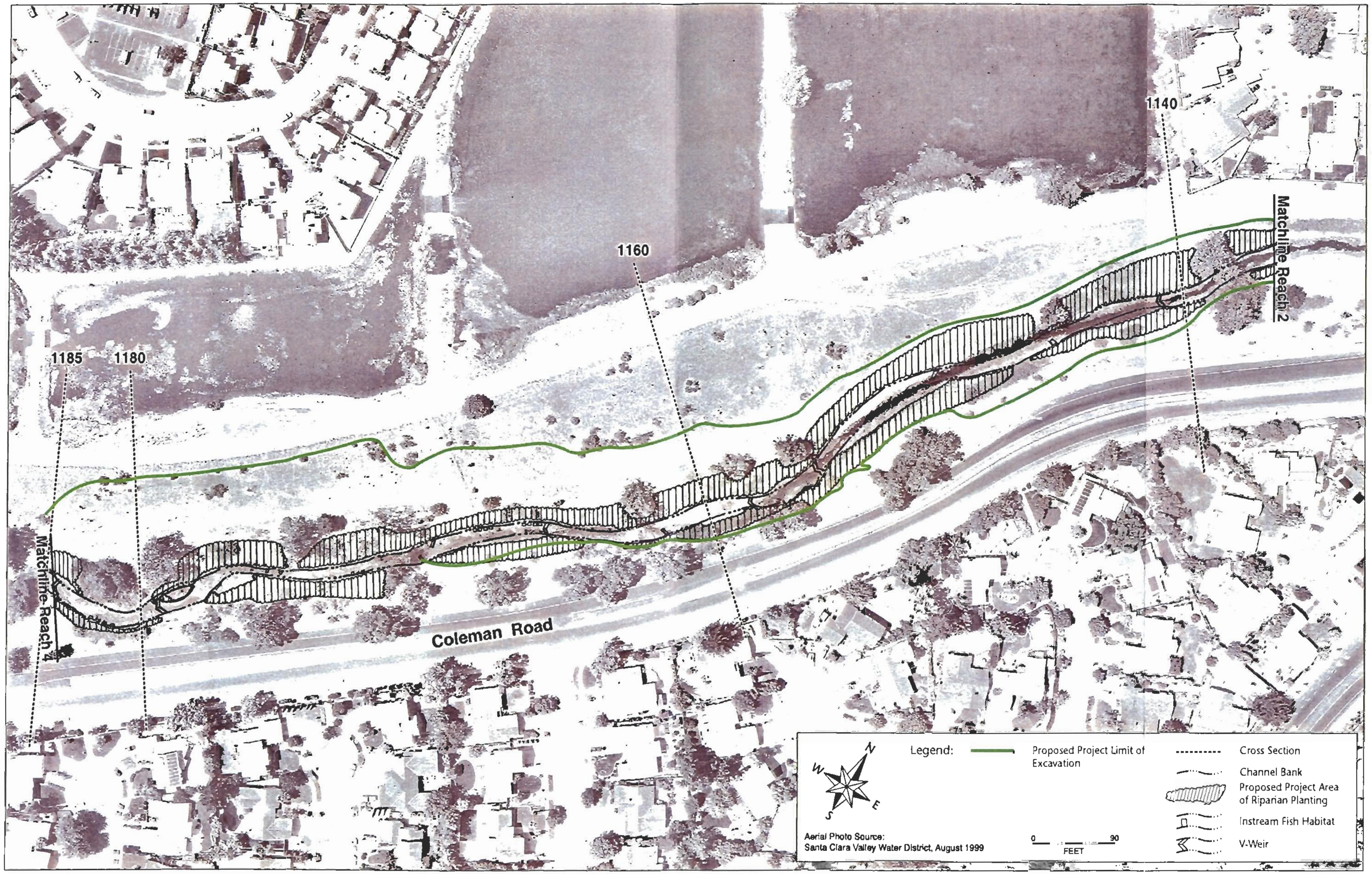
Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 4
Proposed Project - Reach 1



Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 5
Proposed Project - Reach 2



Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 6
Proposed Project - Reach 3

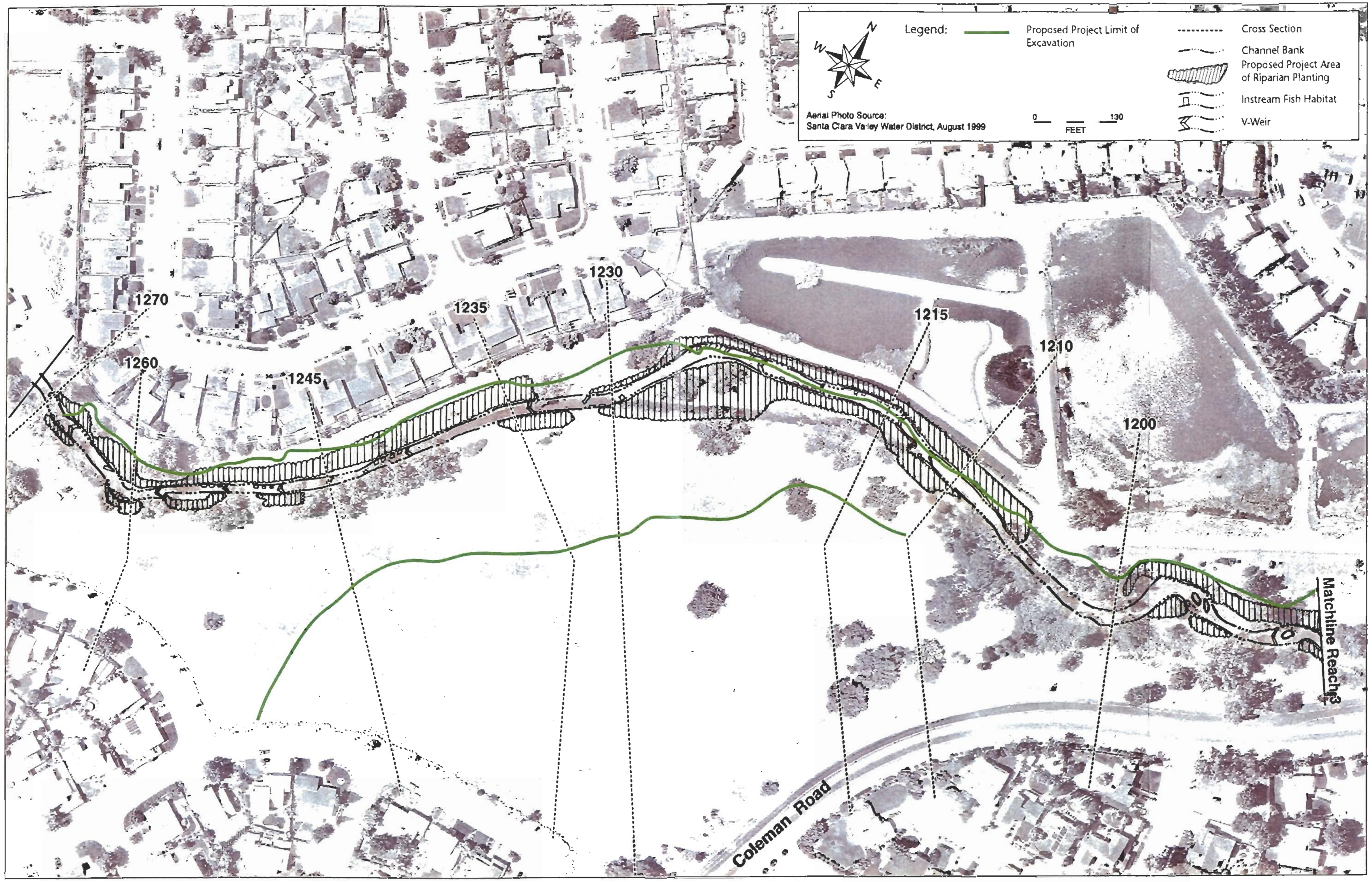
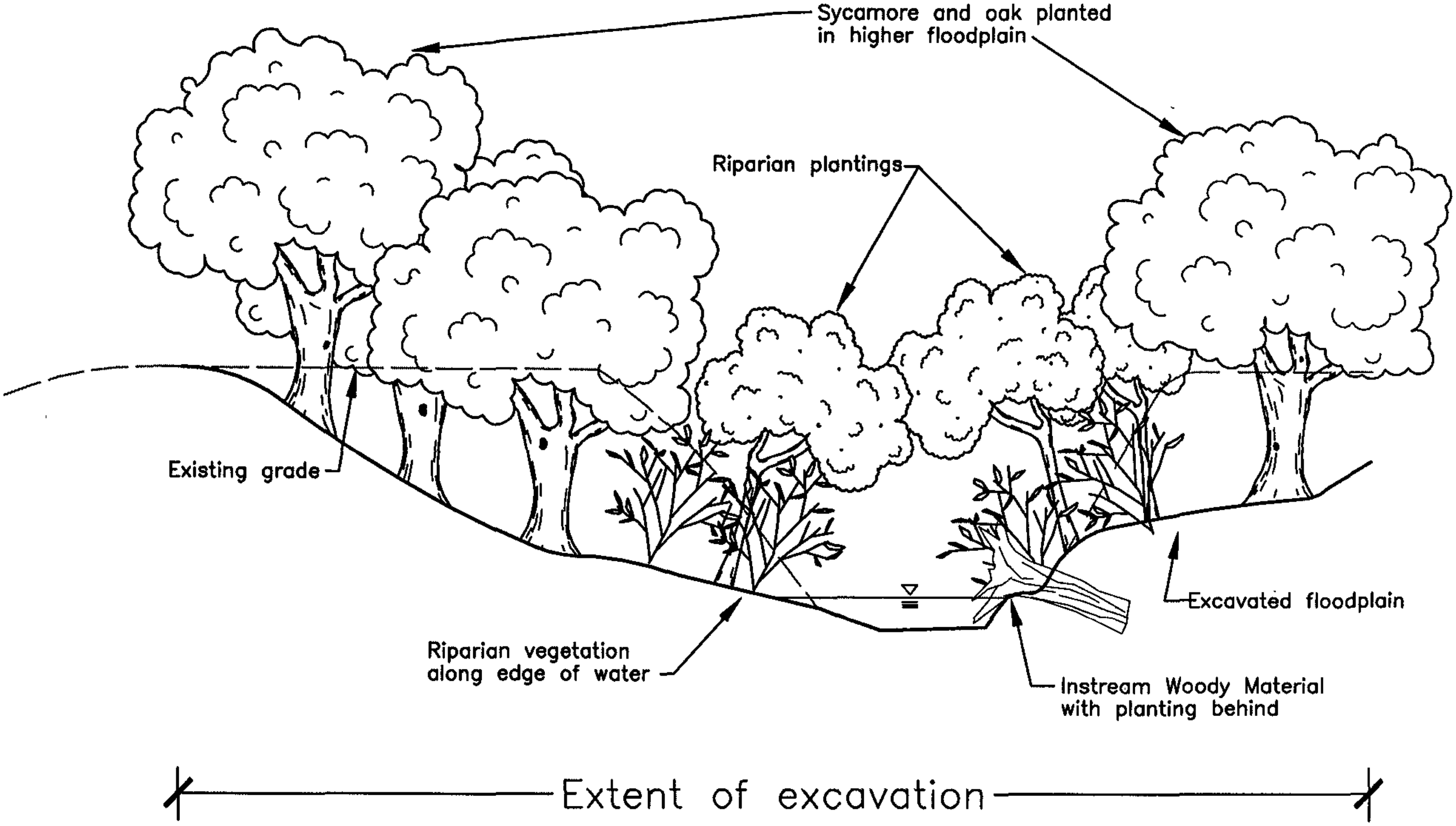


Figure 7
Proposed Project - Reach 4


Sycamore and oak planted in higher floodplain
Riparian plantings
Existing grade
Excavated floodplain
Riparian vegetation along edge of water
Instream Woody Material with planting behind
Extent of excavation

Jones & Stokes

Figure 8
Proposed Project - Typical Cross Section

and banks, to increase cover, and to increase channel complexity and hydraulic diversity. Woody material will also be placed on the bar surfaces in Reach 3 to stabilize the bars and provide additional planting sites.

The planting program in this reach will focus on planting riparian vegetation on expanded floodplain surfaces, in areas where the channel has been relocated, and on sites created by the installation of bank structures and placement of IWM on the backs of bars. Oak woodland species will be planted on the higher surfaces to fill gaps in existing vegetation.

2.4.1.4 Reach 4, Proposed Project

In the downstream segment of the reach, significant SRA cover vegetation already exists and fish habitat values are high. Minimal modifications will be made to the channel in this portion of Reach 4 (Figure 7). Woody material will be placed in an existing erosion cusp to protect the maintenance road, shelter young riparian vegetation, and provide additional planting sites.

Downstream from Percolation Pond 1, which serves as a settling basin for the percolation pond system, approximately 350 feet of the existing maintenance road will be shifted to the north to create a wider bench adjacent to the channel. This shift will increase flood conveyance capacity and provide a buffer to protect the road from bank erosion.

In the area adjacent to Percolation Pond 1, the channel will be relocated north to reoccupy a historical channel alignment. Two existing sycamores may be affected by the channel alignment. Approximately 600 feet of new channel will be created. This realignment will require relocating the maintenance road approximately 10 feet to the north, and filling the existing channel to create a new floodplain. Percolation Pond 1 will not be modified. These actions will lengthen the channel and increase instream cover and channel complexity. The channel alignment will use existing mature trees to shade the new stream surface. Existing Phase 1 plantings affected by the channel realignment will be transplanted to appropriate areas.

In the upstream segment of Reach 4, the floodplain will be expanded (Figure 4). On the south side of the channel, a broad lowered floodplain surface will be graded along the stream at the edge of the Los Capitancillos Freshwater Wetland Mitigation Site. On the north side of the channel, the width of the maintenance road will be reduced to 25 feet to create a floodplain bench. In addition, some of the existing riprap along the north bank will be removed.

The planting program in Reach 4 will focus on planting riparian vegetation and oak woodland species on created surfaces. Along the south bank of the creek, existing riparian vegetation upstream will be preserved. Additional project features that will be implemented in Reach 4 include installing IWM to provide planting sites on bar surfaces and installing rootwads and other structures to stabilize the outside banks of meander bends and to create instream cover.

2.4.1.5 Best Management Practices

Best management practices (BMPs) are methods, measures, or practices that avoid, reduce or minimize a project's effects on various resources. BMPs include, but are not limited to, structural and nonstructural controls and operations and maintenance procedures. They can be applied before, during, and after activities to reduce or eliminate environmental effects. BMPs are part of the project design and/or constitute routine District procedures; by contrast, mitigation measures are developed separately from the project design, in order to address specific environmental impacts.

The following sections list and describe BMPs that will be incorporated into the proposed project. In addition to the BMPs described here, project implementation and maintenance will adhere to the procedures listed in the District's most current BMP plan (Santa Clara Valley Water District 1999). Not all of the BMPs listed below are for potentially significant effects. Many BMPs are included to reduce less-than-significant impacts to even lower levels as part of the District's commitment to environmental stewardship.

In some instances, standard BMPs have been refined for application to the proposed project. However, the District believes that in these instances it is appropriate to continue to treat these procedures as BMPs rather than as mitigation measures in the analysis that follows (Chapter 4).

2.4.1.5.1 Vegetation Protection Measures. Measures to protect riparian vegetation during construction will be implemented under the BMPs included in the proposed project's construction drawings and specifications. Prior to project construction, plastic barrier fencing will be erected or other similar measures will be implemented along the boundaries of the construction area in order to protect adjacent vegetation. If any protected trees are damaged during construction, they will be trimmed under the direction of a qualified arborist to minimize the risk of disease. If any trees not approved for removal are damaged beyond recovery during construction, they will be replaced either with trees of the same species or with trees of another approved species listed in the project drawings and specifications.

2.4.1.5.2 Storm Water Pollution Prevention Plan. The proposed project is subject to the stormwater quality regulations of the NPDES, described in Section 402 of the federal CWA (see related discussion in Chapter 1 under *Consultation and Other Requirements*). In California, the NPDES program requires that any construction activity disturbing an area of 5 acres or more comply with the statewide General Permit, as administered by the SWRCB. The General Permit requires the elimination or minimization of stormwater and non-stormwater discharges from construction sites and the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) for the project. The SWPPP must be retained at the construction site. Implementation of the SWPPP will be monitored during project construction. Upon completion of project construction, SWRCB will be notified that all state and local requirements have been met.

The primary elements of a SWPPP include:

- a description of site characteristics, including runoff and streamflow characteristics and soil erosion hazard;

- a description of proposed construction procedures;
- a description of measures that will be implemented for erosion and sediment control (discussed in more detail below);
- a description of measures that will be implemented to prevent toxic materials spills (spill prevention and response plan, discussed in more detail below); and
- a description of proposed construction-site housekeeping practices.

In addition to these primary elements, the SWPPP must also specify that the extent of soil and vegetation disturbance will be minimized and that the area of soil disturbed at any given time will be minimized.

The following sections describe the required components of the erosion and sediment control measures and the spill prevention and response plan included in the SWPPP.

2.4.1.5.2.1 Erosion and Sediment Control Measures. Because increased sediment input to Guadalupe Creek may have an adverse impact on aquatic species and their habitat, measures to control the proposed project's contribution to erosion and movement of sediment into the creek will be implemented. These may include both vegetative and structural measures as well as construction-site housekeeping practices. The contractor selected for project construction will:

- conduct construction activities during the dry season;
- conduct all construction work in accordance with site-specific construction plans that minimize the potential for increased sediment inputs to the creek;
- divert concentrated runoff away from channel banks;
- minimize vegetation removal;
- identify with construction fencing all areas that require clearing, grading, revegetation, or recontouring and minimize the extent of areas to be cleared, graded, recontoured, or otherwise disturbed;
- grade and stabilize spoils sites to minimize erosion and sediment input to the creek and generation of airborne particulate matter (PM10) (see discussions under *Soil Management* and *Measures to Implement BAAQMD's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* below);
- implement erosion control measures as appropriate to prevent sediment from entering the creek channel or other watercourses to the extent feasible, including the use of silt fencing or fiber rolls to trap sediments and erosion control blankets on channel banks;

- mulch disturbed areas as appropriate and plant with appropriate species as soon as practicable after disturbance; and

- avoid operating equipment in flowing water by using temporary cofferdams or other suitable structures to divert flow around the channel and bank construction area.

2.4.1.5.2.2 Spill Prevention and Response Plan. As part of the project SWPPP, the contractor selected for the proposed project will prepare a spill prevention and response plan that regulates the use of hazardous and toxic materials, such as the petroleum-based fuels and lubricants for construction equipment. The District will oversee implementation of the spill prevention and response plan. Elements of the plan will ensure that:

- workers are trained to avoid and manage spills;
- construction and maintenance materials are prevented from entering the creek;
- all spills are cleaned up immediately and appropriate agencies are notified of any spills and of the cleanup procedures employed;
- staging and storage areas for equipment, materials, fuels, lubricants, solvents, and other possible contaminants are located at least 100 feet away from the creek;
- vehicles are removed from the creek's normal high-water area before refueling and lubricating;
- vehicles are immediately removed from work areas if they are leaking; and
- equipment is not operated in flowing water (suitable temporary structures are installed to divert water around in-channel work areas).

2.4.1.5.3 Soil Management Plan. Prior to construction a Soil Management Plan (SMP) will be developed for the proposed project. The SMP will include protocols for classifying the content of wastes in soil based on standard analytical tests used for the disposal of material at appropriately licensed disposal sites. The SMP will also provide criteria for classification of material considered inert based on California's standard waste extraction test procedures, as well as procedures for disposal and reuse of these materials. At an appropriate time prior to disposal, confirmation sampling for mercury and lead will be conducted and the soil classified pursuant to the criteria outlined in the approved SMP. If evidence of waste or fuel materials is found or any unusual materials or odors are encountered in the soil, all constituents of concern will be analyzed, including metals, hydrocarbons, and polynuclear aromatic hydrocarbons. Prior to project implementation, the SMP will be updated to reflect final project design and to incorporate input from the RWQCB regarding management of soils containing elevated mercury concentrations. The updated Soil Management Plan will be submitted to the RWQCB for approval before implementation. The following additional restrictions on soil management will be included in the SMP.

- Sediments with mercury concentrations that exceed hazardous waste criteria under federal or state law must be disposed of offsite in appropriately licensed disposal sites. The determination of hazardous properties shall comply with all applicable statutes and regulations pertaining to hazardous wastes.

- Excavated soils with mercury concentrations not exceeding hazardous waste criteria but greater than 1 part per million (ppm) may not be reused onsite unless such sediments are placed above the low-flow channel or in adjacent areas where frequent exposure to overbank flow is not anticipated to occur (i.e., above the water surface elevation defined by the 3-year recurrence interval[2], or as backfill away from the channel).

- Excavated surfaces above the elevation of the 3-year recurrence interval that contain mercury concentrations exceeding hazardous waste levels will be overexcavated and replaced with soils meeting the above criteria for onsite reuse. Excavated surfaces below the elevation of the 3-year recurrence interval that contain unconsolidated soils will be overexcavated to a depth of 6 inches and replaced with clean imported soil. Some incidental movement of soil within the active channel may occur during the installation of IWM.

The 1 ppm requirement is based on August 2000 regulatory guidance from the RWQCB stating that reducing concentrations of mercury in bank sediments to 1 ppm or less will reduce the concentration of total recoverable mercury in the water column. Water quality in the project area now exceeds numeric water quality objectives for mercury in the RWQCB's basin plan for the project area and environs. Incorporation of the proposed soil reuse restrictions will result in improved water quality under postproject conditions.

2.4.1.5.4 Construction Period Limits. To reduce the likelihood of adverse impacts on rearing juvenile steelhead and chinook salmon and on adult fish migrating to upstream spawning areas, in-channel construction, including both streambank and channel bed construction, will be limited to the summer low-precipitation period (April 15–October 15), with the condition that construction requiring stream dewatering, stream crossings, or instream work may not commence before May 1. Furthermore, work will be permitted to commence on May 1 only if the stream monitoring criteria have been satisfied by that date. Stream monitoring criteria that must be satisfied will include a determination that average daily water temperatures have exceeded 68 °F for at least 5 consecutive days and that outmigrating salmonids are absent. Determination of the absence of juvenile chinook salmon and steelhead in May will be based on ongoing downstream migrant trapping observations during the previous 14 days. If stream monitoring criteria are not met, in-channel work and dewatering will not be allowed to commence until June 1. If necessary, upstream passage for chinook salmon will be provided through or around construction sites from September 1 through October 15. The determination of the need to provide passage will be based on the occurrence of more than 25 adult chinook salmon, on flow conditions, and on a cooperative assessment of passage needs by the District, NMFS, and DFG. Construction outside the summer low-precipitation period will require previous approval from DFG and NMFS.

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[2] I.e., the elevation to which waters of the 3-year flood (the flood that can be expected to occur every 3 years on average) are expected to rise.

2.4.1.5.5 Construction-Area Fish Management Measures. During project construction, streamflow will be diverted at Masson Dam into the Los Capitancillos percolation pond system. Diversion activities will follow the guidelines listed below.

- Flow will be incrementally diverted from the creek at the upstream boundary of the project area. Diversion will increase progressively over a 4-hour period, by the following increments: 50%, 75%, 90%, 95%, and 100 %. Flow reductions will be conducted under the supervision of a qualified fisheries biologist. This incremental reduction in flow will allow fish to move downstream.

- All native aquatic vertebrates and larger invertebrates will be moved by a qualified fisheries biologist during dewatering.

- Fish will be removed from pools remaining after flow is diverted from the project reaches of the creek. The District, NMFS, and DFG will cooperate to develop a method and protocol for capture and relocation of stranded fish. Qualified fisheries biologists will transport captured fish immediately to a flowing river segment. Fisheries biologists will contact NMFS immediately if any steelhead or chinook salmon are found dead or injured, except for spawned-out adult chinook salmon.

- If a fisheries biologist determines that juvenile chinook salmon and steelhead are present during June and that construction activities may impede their downstream passage, a fish trap will be placed above the upstream barrier and operated by a fisheries biologist. The determination that juvenile chinook salmon and steelhead are present during June will be based on their occurrence during any of the previous 14 days in ongoing downstream migrant trapping. The trap at the construction site will be removed if juvenile chinook salmon and steelhead are not captured at the construction site or by ongoing downstream migrant trapping during 14 consecutive days. In order to maintain fish in good condition, all migrating steelhead and juvenile chinook salmon will be removed from the trap every 24 hours, or at another appropriate time interval, as determined by a qualified fisheries biologist. Captured fish will be counted, measured, and transported immediately to a flowing creek segment that allows downstream migration. Additional details of downstream migrant trapping, including specific reporting requirements, will be coordinated with NMFS.

- Adult chinook salmon may arrive at the downstream end of the project area before the end of construction on October 15. If necessary, upstream passage for chinook salmon will be provided through or around the construction site from September 1 through October 15. Determination of the need to provide upstream passage will be based on the occurrence of adult chinook salmon at the downstream end of the project area. A fish trap will be placed in an appropriate location, chosen in coordination with DFG and NMFS, and operated by a qualified fisheries biologist. In order to maintain fish in good condition, all migrating chinook salmon will be removed from the trap every 24 hours, or at an appropriate time interval, as determined by a qualified fisheries biologist. Captured fish will be counted, measured, and transported immediately to a flowing creek segment that allows upstream migration. Additional details of upstream migrant trapping, including specific reporting requirements, will be coordinated with DFG and NMFS.

2.4.1.5.6 Conservation Measure. Although it is believed that the California red-legged frog is not present in the project area (see *Biological Resources* section in Chapter 3), and no adverse effects on the red-legged frog are expected from implementation of the proposed project, the District will conduct preconstruction clearance surveys for red-legged frogs. These surveys will consist of two day and two night surveys conducted by a qualified biologist within 120 days of the onset of initial project construction activities. If red-legged frogs are heard or seen during the preconstruction surveys, construction will be postponed and USFWS will be contacted for guidance. Construction activities will be prohibited from unnecessarily disturbing aquatic habitat.

2.4.1.5.7 Measures to Comply with Migratory Bird Treaty Act. The project site is located in and adjacent to habitat that may support nesting birds protected under the MBTA. Barrier fencing erected as part of the project's vegetation protection measures will also protect nesting vegetation located outside the boundaries of the construction area. If any construction occurs during the migratory bird nesting season (February 16–July 31), a qualified biologist will survey within a 250-foot radius of the construction area for eggs and young migratory birds immediately prior to construction. If eggs or migratory birds are found inside the construction area boundaries, the District will develop appropriate protective measures and will inform DFG of its actions.

2.4.1.5.8 Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities. The following list of measures for controlling PM10 emissions will be implemented during project construction. These measures are contained in the BAAQMD's Feasible Control Measures for PM10 Emissions from Soil Removal Activities (Bay Area Air Quality Management District 1996).

- All active construction sites will be watered at least twice daily. Watering should be conducted frequently enough to prevent the generation of visible dust emissions.

- All trucks hauling soil, sand, and other loose materials will be covered or will be required to maintain at least 2 feet of freeboard.

- All unpaved access roads, parking areas, and staging areas will be watered three times daily, or will be stabilized using nontoxic soil stabilizers.

- Apply non-toxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more).

- Enclose, cover, water twice daily, or apply (non-toxic) soil stabilizers to exposed stockpiles.

- Streets will be swept daily with water sweepers if visible soil material is carried onto adjacent public streets.

- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.

- Traffic speeds on unpaved roads will be limited to 15 mph.

2.4.1.5.9 Measures to Address Traffic-Related Effects. The District will require the selected contractor to prepare and implement a traffic safety plan. This plan will address appropriate vehicle size and speed, travel routes, detour and closure plans, flagperson requirements, locations of turnouts to be constructed, coordination with law enforcement and fire control agencies, coordination with Caltrans personnel (for work affecting state road rights-of-way), emergency access to ensure public safety, and need for traffic and speed-limit signs. Additionally, the contractor will limit transportation of imported and exported materials to non-peak traffic commute hours (9:00 a.m. to 4:00 p.m., Monday through Friday).

2.4.1.5.10 Measures to Address Cultural Resources. An archaeologist meeting the Secretary of the Interior's Standards for Professional Archaeologists will be on call during ground-disturbing activities. If a prehistoric archaeological site is discovered, criteria of the NRHP will be used to evaluate the site for significance. A Native American monitor will be present during the evaluation of the site's significance. Work in the area will be stopped until the site is evaluated and appropriately treated. If prehistoric or historic archaeological sites that appear eligible for NRHP are discovered, procedures stipulated under implementing regulations for the NHPA (36 CFR 800) will be followed. These procedures include consulting with SHPO to confirm eligibility of the site(s) for the National Register and development of a Memorandum of Agreement that specifies treatment for the site(s). Treatment may include data recovery, site avoidance, or capping the site to avoid further impacts.

If human remains of Native American origin are discovered during project construction, relevant procedures identified in the California State public health and safety codes will be followed. Public Resources Code Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the county coroner can determine whether the remains are those of a Native American. If the remains are determined to be those of a Native American, the coroner must contact the California Native American Heritage Commission. If human remains are discovered, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

1. The Santa Clara County Coroner has been informed and has determined that no investigation of the cause of death is required; and

2. if the remains are of Native American origin:

    a. the descendants of the deceased Native American(s) have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98; or

b. the Native American Heritage Commission was unable to identify a descendant or the descendant failed to make a recommendation within 24 hours after being notified by the commission.

According to California Health and Safety Code, six or more burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052).

2.4.1.5.11 Measures to Address Noise-Related Effects. The contractor selected for the project will be required to comply with all relevant provisions of the City noise ordinance; noise-reducing construction practices will be employed. For example, all construction equipment will be required to have sound-control devices at least as effective as those originally provided by the manufacturer, and no equipment will be permitted to have an unmuffled exhaust. In general, construction will take place between 7:00 a.m. and 5:00 p.m., Monday through Friday, and no construction activities will occur on holidays or weekends. Extending weekday hours and working weekends may be necessary for short periods to complete some aspects of the project; however, these periods will be limited. In addition, the contractor will implement appropriate additional noise mitigation measures, including, but not limited to, the following: changing the location of stationary construction equipment, shutting off idling equipment, and notifying adjacent residents in advance of construction work.

2.4.1.5.12 Maintenance and Monitoring During the Establishment Period. During the 3-year period following project implementation, the proposed project will require normal maintenance activities associated with habitat restoration. The contractor selected by the District will be responsible for maintaining the restoration sites during the 3-year establishment period. The contractor will perform the following general maintenance activities: weed control, irrigation system maintenance, and planting replacement. Specific methods and schedules for maintenance activities will be included in the final contract documents prepared for the proposed project.

In addition, the proposed project will adhere to the monitoring and adaptive management program established by the Downtown Project MMP (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). The Downtown Project MMP requires that the District monitor a number of specific indicators and assess the proposed project relative to a series of measurable performance objectives. Indicators that will be monitored during the 3-year post-construction monitoring period include:

- survival of planted trees and shrubs;
- health and vigor of planted trees, shrubs, and seeds;
- natural recruitment of native species;
- vegetative cover;
- non-native species cover;

- water temperature; and
- anadromous fish passage and habitat quality.

The monitoring program will be implemented by the contractor selected by the District.

2.4.1.5.13 Long-Term Maintenance. The District now conducts limited channel maintenance activities on the reach of Guadalupe Creek between Camden Avenue and Coleman Road, which includes the project area. These activities include:

- removing large woody debris that impedes flood conveyance,
- removing accumulated sediment that reduces flood conveyance capacity,
- controlling vegetation under the Meridian Avenue and Almaden Expressway bridges as needed to maintain flow,
- stabilizing eroding banks to protect existing infrastructure, and
- controlling vegetation growth on upper floodplain terraces by mechanical (mowing) or chemical means to comply with local fire prevention ordinances.

Under the existing maintenance program, sediment removal activities are limited to key areas such as the Almaden Expressway Bridge; maintenance workers use existing access points in order to avoid adverse impacts on riparian vegetation. In addition, channel maintenance activities are conducted in compliance with RWQCB and DFG requirements and follow standard BMPs to avoid adverse impacts on water quality, vegetation, and fish and wildlife.

Implementation of the proposed project is not expected to result in any significant change in the District's maintenance activities in the project area, although it may slightly decrease the need for ongoing maintenance. The project is designed to stabilize existing areas of erosion and to decrease local sediment input to Guadalupe Creek. In addition, although the project will significantly increase the area and density of streamside vegetation on the project site, planting is not expected to reduce flood conveyance capacity; planting areas near the bridges have been tapered to reduce the potential for vegetation to obstruct flow or to trap sediment and waterborne debris.

As described in Chapter 5 (*Cumulative Impacts and Other Required Analyses*), the District is currently developing a programmatic EIR for the stream maintenance program. The purpose of the programmatic EIR is to evaluate impacts associated with present and future routine stream maintenance activities and to develop BMPs and mitigation measures that will address potential adverse environmental effects of ongoing maintenance activities. Because implementation of the proposed project is not expected to change the District's maintenance practices in the project area significantly, the programmatic EIR will adequately address the potential impacts of postproject maintenance activities in the project area. To avoid redundancy with the stream maintenance program EIR, Chapter 4 (*Environmental Impacts and Mitigation Measures*) does not contain additional discussion of the impacts of routine maintenance activities.

2.4.1.6 Project Construction Schedule

Construction of the proposed project is scheduled to begin in June 2001, with an expected completion date of December 2001.

2.4.2 Reduced Channel and Floodplain Modification (Alternative 1)

The Reduced Channel and Floodplain Modification Alternative (Alternative 1) would incorporate many of the restoration features and all of the BMPs specified for the proposed project (Figures 9–12, Figure 13). However, under Alternative 1 excavation would focus on the 15-foot zone adjacent to the low-flow channel and the number of proposed channel shifts would be reduced relative to the proposed project. Planting densities would also be reduced to compensate for reduced flood conveyance capacity. Implementation of this alternative would involve shifting approximately 1,200 lf of existing stream channel, excavating and removing approximately 31,000 cubic yards of material, and importing 11,500 cubic yards of material to create suitable planting sites. In addition, approximately 1,095 lf of bank protection features would be installed, and approximately 4 acres of riparian vegetation and 9,500 lf of SRA cover vegetation would be established under Alternative 1. Specific project features associated with this alternative are described below on a reach-specific basis.

2.4.2.1 Reach 1, Alternative 1

In Reach 1, Alternative 1 will emphasize planting existing surfaces within the 15-foot zone adjacent to the low-flow channel, and minimizing physical modifications to the channel and floodplain (Figure 9). However, portions of the existing channel will be shifted to create new floodplain surfaces for planting along Coleman Road and to protect the maintenance road levee from further erosion.

Instream structures—e.g., rootwads and other IWM, stream barbs, boulders, and v-weirs—will be incorporated into the channel bed and banks to control existing erosion, narrow the low-flow channel, provide cover and instream habitat for fish, and improve hydraulic diversity while maintaining the low sinuosity of the existing planform. Rootwads, barbs, and similar features will also be used to stabilize the bench along Coleman Road and to provide instream cover for fish.

The planting program for Reach 1 will emphasize planting sycamores and other riparian vegetation on existing bar surfaces and existing and created floodplain surfaces to create a strip of riparian vegetation along the north channel bank, and to fill gaps in the existing riparian canopy. The bench at the toe of the slope along Coleman Road will also be planted with riparian species. Oak woodland species will be planted at relatively low elevations where soils are coarse and permeable and contain less moisture. Immediately upstream from the Almaden Expressway Bridge, planting areas will be tapered to ensure that the bridge opening is unobstructed, and existing access to the bridge will be maintained to facilitate maintenance activities.

2.4.2.2 Reach 2, Alternative 1

Under Alternative 1, the existing planform of the creek will generally be maintained in Reach 2 (Figure 10). Minor modifications will be made to lower floodplains in most areas, except downstream from the Meridian Avenue Bridge, where more extensive excavation will expand the floodplain on the parcel owned by the City. This expansion will reduce the flow velocity in the main channel while preserving a band of willows along the south bank. An existing sycamore at the top of the bank will be removed to allow for the expansion of the floodplain. An existing oak in the same area may also be removed.

Instream structures will also be installed in Reach 2. IWM will be used to improve bank stability, to increase instream cover, and to increase channel complexity and hydraulic diversity in the low-flow channel. Bank stabilization structures will be used on the bend upstream from Meridian Avenue to protect the maintenance road and improve instream cover. Near the downstream end of Reach 2, bank stabilization measures will be installed at the toe of the bank adjacent to Coleman Road.

Planting in Reach 2 will focus on establishing riparian vegetation on the lower floodplain surfaces within the 15-foot zone adjacent to the low-flow channel. Immediately upstream and downstream from the Meridian Avenue Bridge, the planting areas will be tapered to ensure that the bridge opening is unobstructed. Sycamore woodland species will be planted on the north side of the creek immediately upstream from the bridge to ensure that the plantings do not impede floodflows.

2.4.2.3 Reach 3, Alternative 1

Under Alternative 1, project features proposed for Reach 3 will focus on creating planting surfaces for riparian vegetation, and increasing hydraulic diversity in the channel (Figure 11). IWM will be added to stabilize the bed and banks, to increase cover, and to increase channel complexity and hydraulic diversity. Woody material will also be placed on the bar surfaces in Reach 3 to stabilize the bars and provide additional planting sites.

The planting program in this reach will focus on planting riparian vegetation within the 15-foot zone adjacent to the low-flow channel, and on sites created by the installation of bank structures and placement of IWM on the backs of bars. Oak woodland species will be planted on the higher surfaces to fill gaps between existing vegetation.

2.4.2.4 Reach 4, Alternative 1

In the downstream segment of the reach, significant SRA cover vegetation already exists and fish habitat values are high (Figure 12). Under Alternative 1, only minor modifications will be made to the channel in this portion of Reach 4. Woody material will be placed in an existing erosion cusp to protect the maintenance road, shelter young riparian vegetation, and provide additional planting sites.

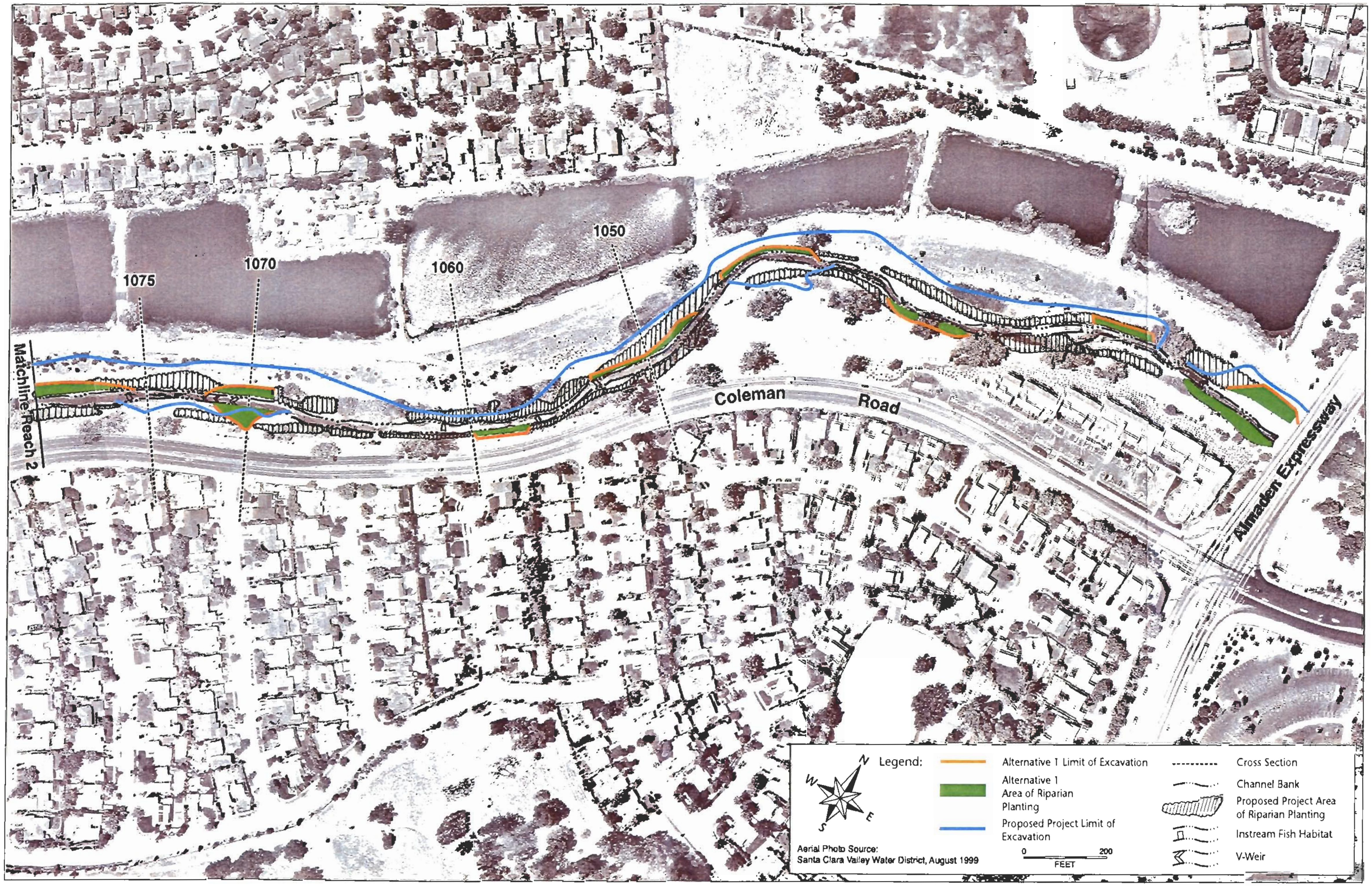
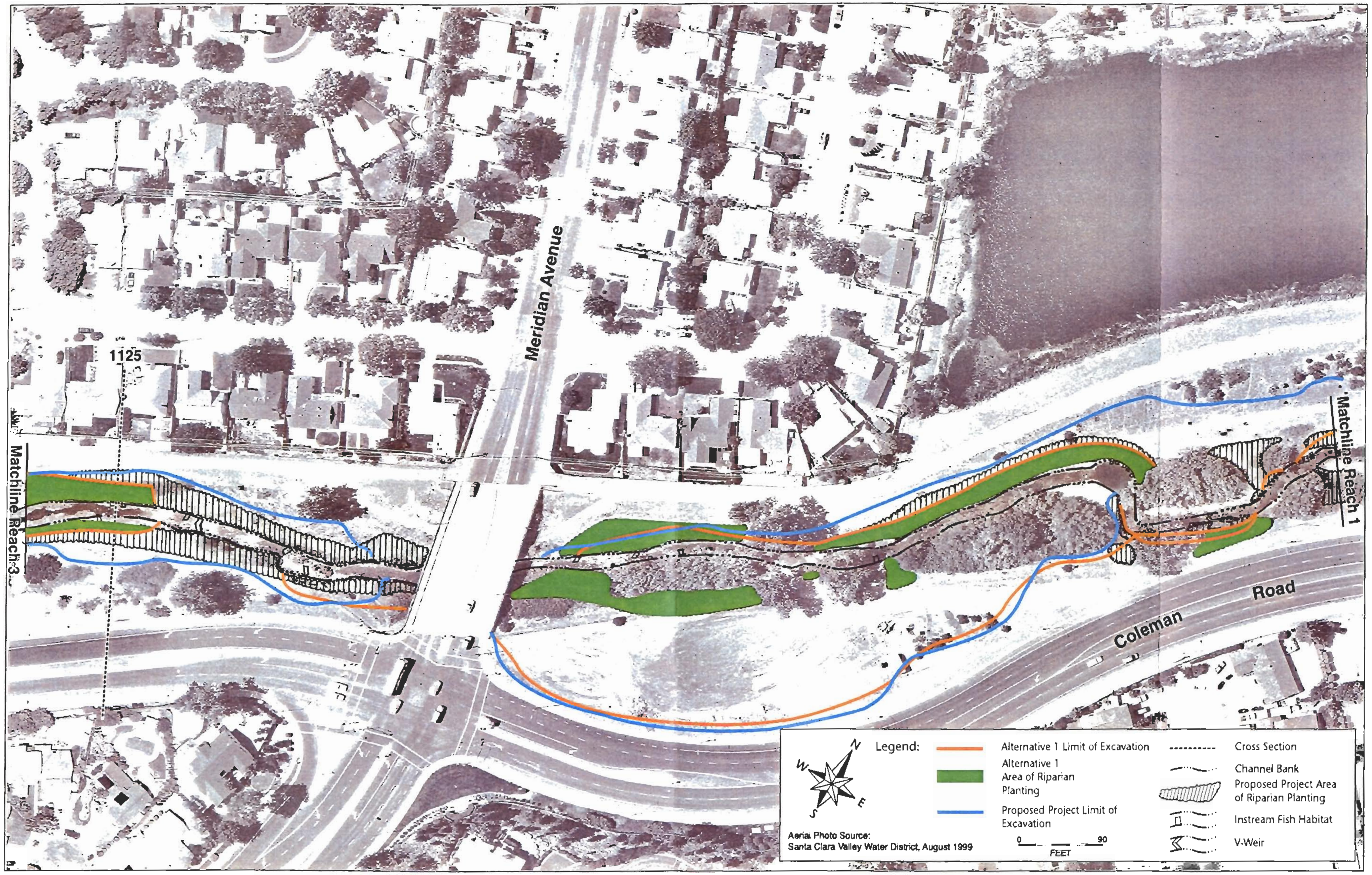

1075
1070
1060
1050
Matchline Reach 2
Coleman
Road
Almaden Expressway
N
W
E
S
Legend:
Alternative 1 Limit of Excavation
Alternative 1 Area of Riparian Planting
Proposed Project Limit of Excavation
Cross Section
Channel Bank
Proposed Project Area of Riparian Planting
Instream Fish Habitat
V-Weir
0
200
FEET
Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 9
Alternative 1 - Reach 1


Meridian Avenue
1125
Matchline Reach 3
Matchline Reach 1
Coleman Road
N
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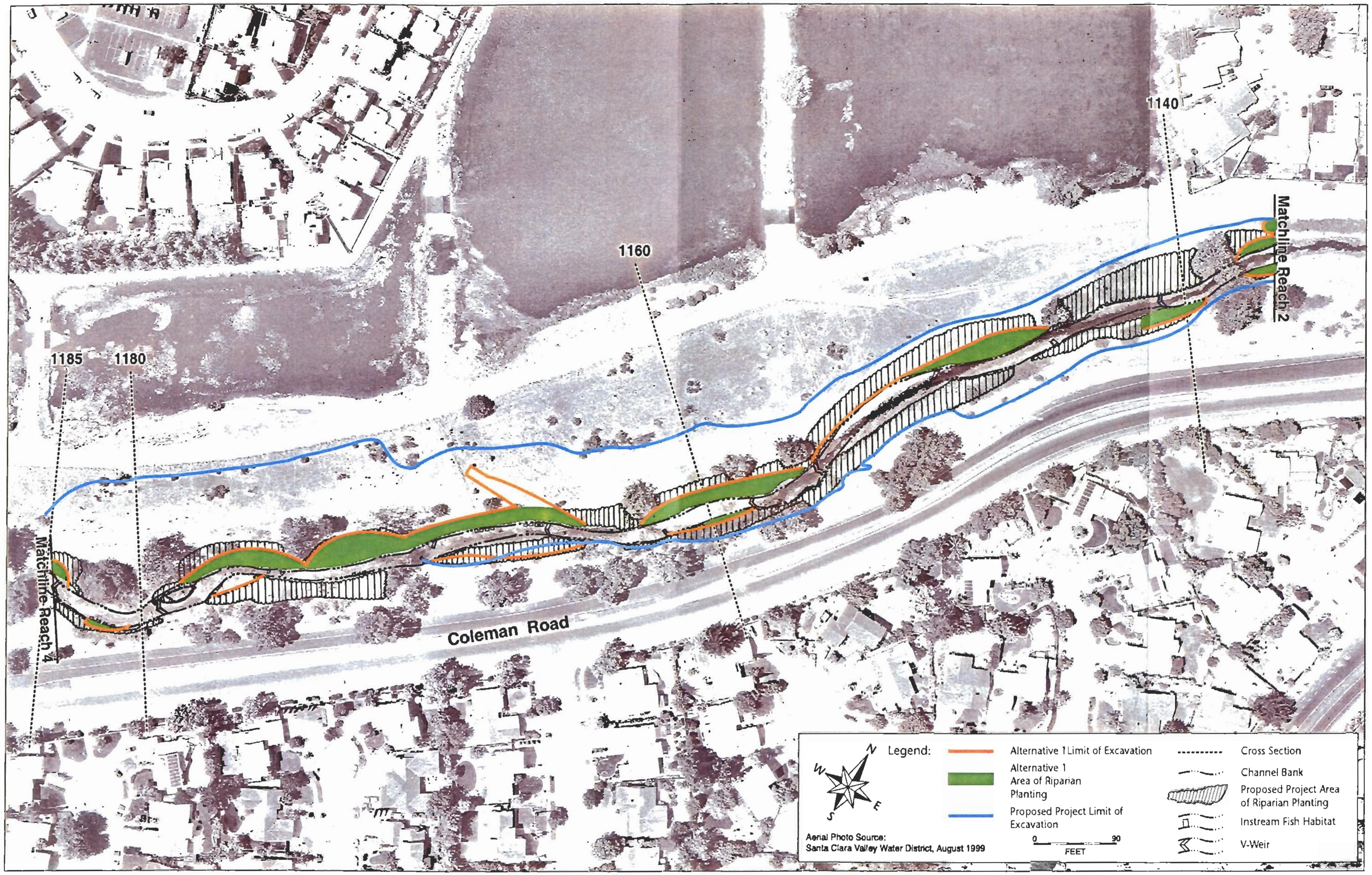
Legend:
Alternative 1 Limit of Excavation
Alternative 1 Area of Riparian Planting
Proposed Project Limit of Excavation
Cross Section
Channel Bank
Proposed Project Area of Riparian Planting
Instream Fish Habitat
V-Weir
0
90
FEET

Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 10
Alternative 1 - Reach 2



1140
1160
1185
1180
Matchline Reach 2
Matchline Reach 4
Coleman Road
N
W
E
S
Legend:
Alternative 1 Limit of Excavation
Alternative 1 Area of Riparian Planting
Proposed Project Limit of Excavation
Cross Section
Channel Bank
Proposed Project Area of Riparian Planting
Instream Fish Habitat
V-Weir
0
90
FEET
Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 11
Alternative 1 - Reach 3

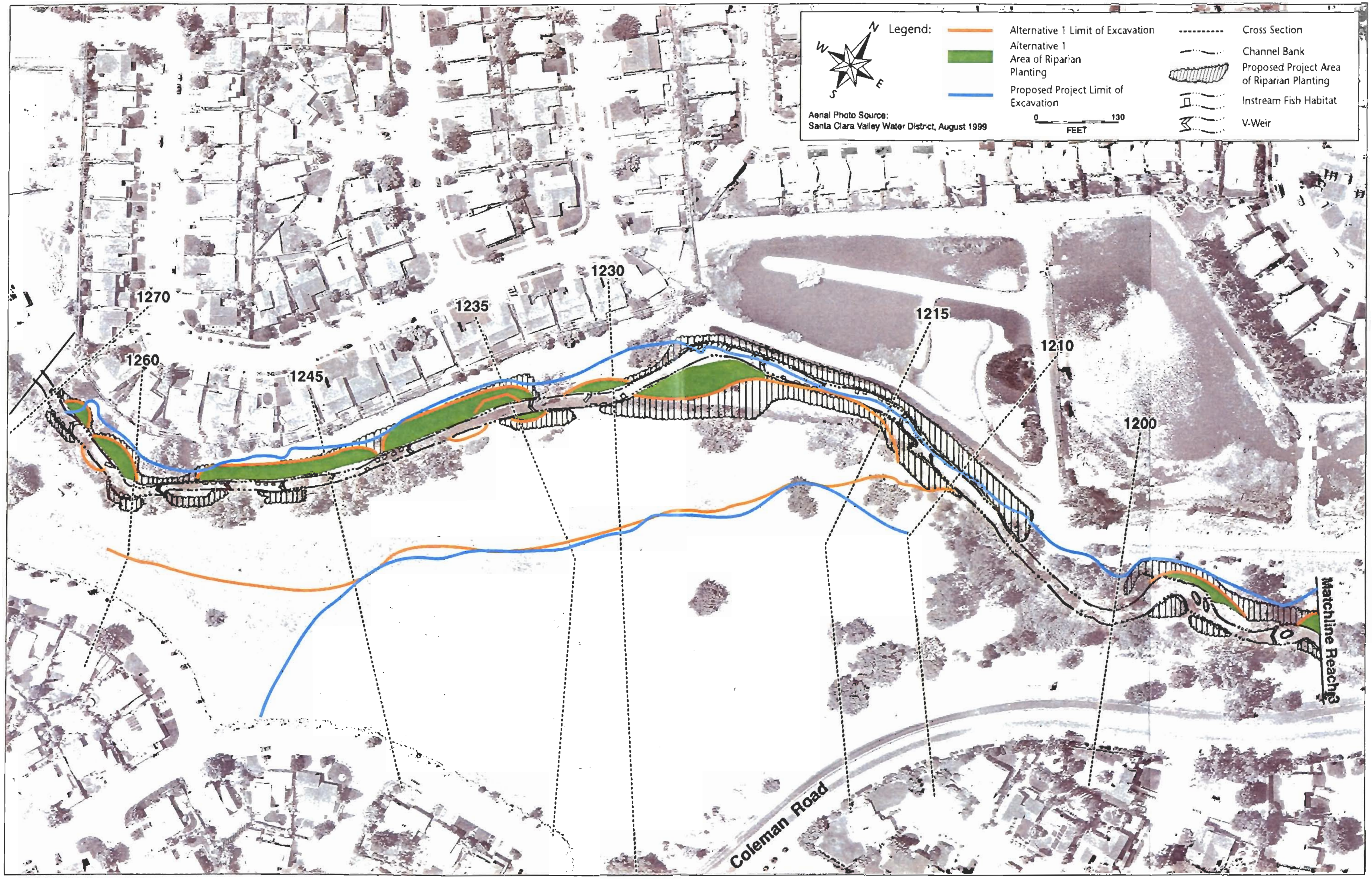
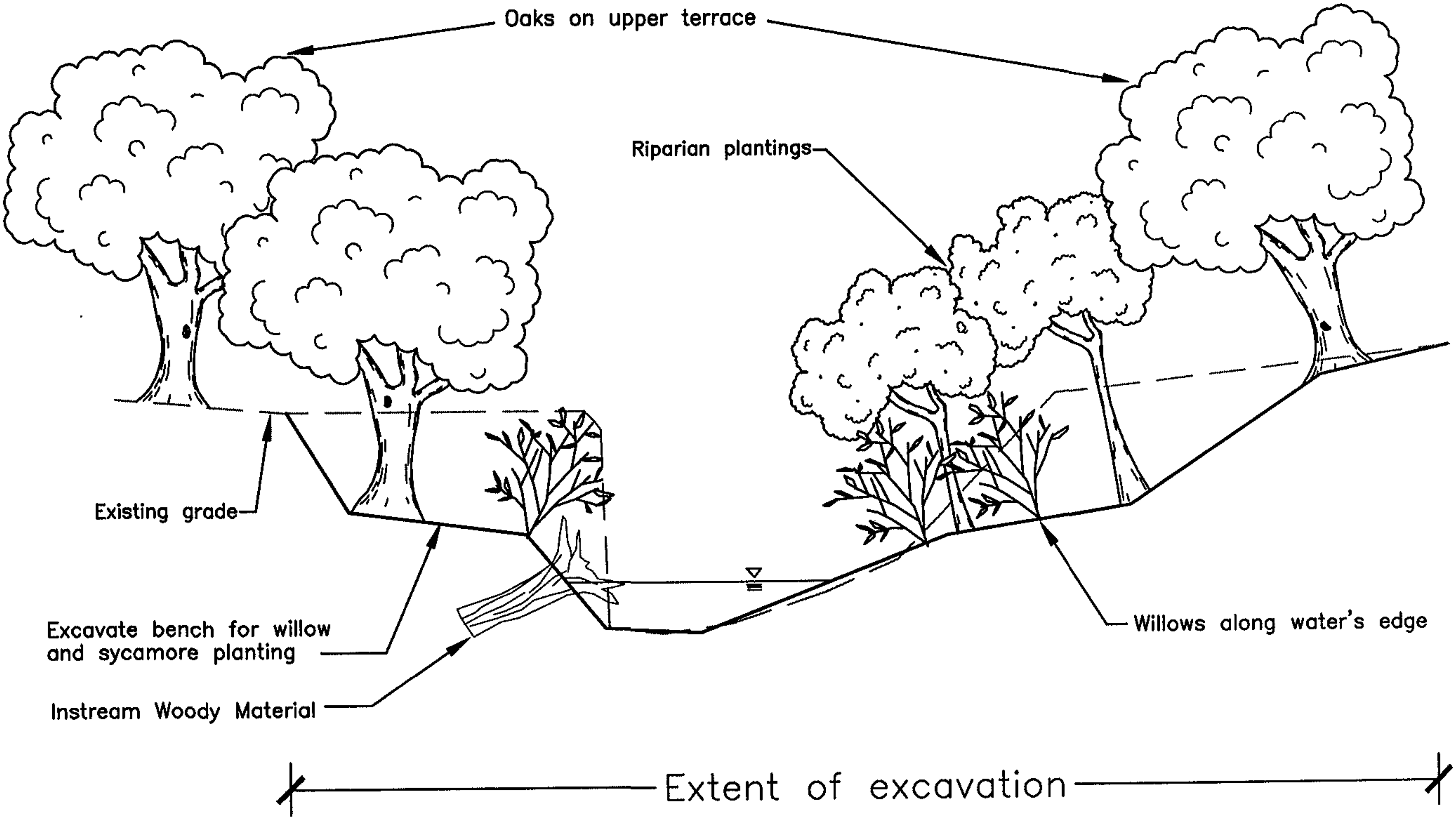
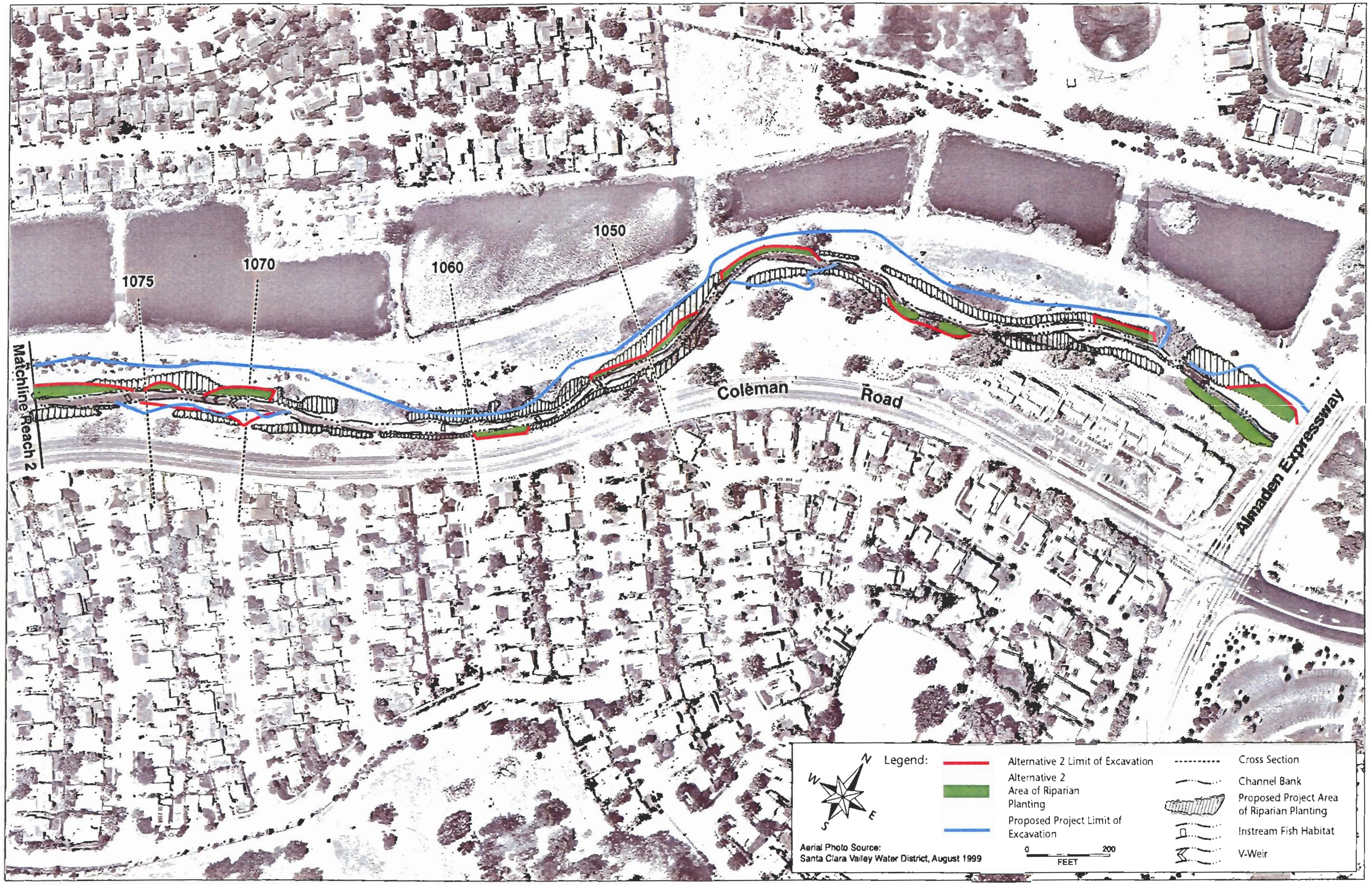

Legend:
N
W
E
S
Alternative 1 Limit of Excavation
Alternative 1 Area of Riparian Planting
Proposed Project Limit of Excavation
Cross Section
Channel Bank
Proposed Project Area of Riparian Planting
Instream Fish Habitat
V-Weir
Aerial Photo Source:
Santa Clara Valley Water District, August 1999
0
130
FEET
1270
1260
1245
1235
1230
1215
1210
1200
Coleman Road
Matchline Reach 3

Figure 12
Alternative 1 - Reach 4



Jones & Stokes

Figure 13
Alternative 1 - Typical Cross Section


1075
1070
1060
1050
Matchline Reach 2
Coleman Road
Almaden Expressway
Legend:
N
W
E
S
Alternative 2 Limit of Excavation
Alternative 2 Area of Riparian Planting
Proposed Project Limit of Excavation
Cross Section
Channel Bank
Proposed Project Area of Riparian Planting
Instream Fish Habitat
V-Weir
0
200
FEET

Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 14
Alternative 2 - Reach 1

Downstream from Percolation Pond 1, which serves as a settling basin for the percolation pond system, approximately 350 feet of the existing maintenance road will be shifted to the north to create a wider bench adjacent to the channel. This shift will increase flood conveyance capacity and provide a buffer to protect the road from bank erosion.

In the area adjacent to Percolation Pond 1, the channel will be relocated north to reoccupy a historical channel alignment. Two existing sycamores may be affected by the channel alignment. Approximately 600 feet of new channel will be created. This realignment will require relocating the maintenance road approximately 10 feet to the north, and filling the existing channel to create a new floodplain. Percolation Pond 1 will not be modified. These actions will lengthen the channel and increase instream cover and channel complexity. The channel alignment will use existing mature trees to shade the new stream surface. Existing Phase 1 plantings affected by the channel realignment will be transplanted in appropriate areas.

In the upstream segment of Reach 4, the floodplain will be expanded. On the south side of the channel, a broad lowered floodplain surface will be graded along the stream at the edge of the Los Capitancillos Freshwater Wetland Mitigation Site. On the north side of the channel, the width of the maintenance road will be reduced to 25 feet to create a floodplain bench. In addition, some of the existing riprap along the north bank will be removed.

The planting program in Reach 4 will focus on planting riparian vegetation and oak woodland species on created surfaces. Along the south bank of the creek, existing riparian vegetation upstream will be preserved. Additional project features that will be implemented in Reach 4 include installing IWM to provide planting sites on bar surfaces and installing rootwads and other structures to stabilize the outside banks of meander bends and to create instream cover.

2.4.3 Minimal Channel and Floodplain Modification (Alternative 2)

The Minimal Channel and Floodplain Modification Alternative (Alternative 2) would incorporate many of the restoration features and all of the BMPs specified for the proposed project (Figures 14–17, Figure 18). However, under Alternative 2, the amount of bank excavation would be substantially reduced and excavation would be restricted to key areas within the 15-foot zone adjacent to the low-flow channel. Only one channel planform shift would occur (Reach 4) under Alternative 2. Planting densities throughout the project site would be reduced to compensate for reduced flood conveyance capacity, and planting in Reach 4 would be limited to in-fill planting within existing stands of riparian vegetation. The number of bank and bed stabilization structures installed under Alternative 2 would be substantially increased to reduce the potential for channel incision and bank erosion. Implementation of this alternative would involve shifting approximately 300 lf of existing stream channel, excavating and removing approximately 11,500 cubic yards of material, and importing 7,000 cubic yards of material to create suitable planting sites. In addition, approximately 1,285 lf of bank protection features would be installed, and approximately 2.3 acres of riparian vegetation and 6,800 lf of SRA cover vegetation would be established under

Alternative 2. Specific project features associated with this alternative are described below on a reach-specific basis.

2.4.3.1 Reach 1, Alternative 2

Under Alternative 2, the planting program for Reach 1 will emphasize planting sycamores and other riparian vegetation on existing floodplain and bar surfaces to create a strip of riparian vegetation along the north bank, and to fill gaps in the existing riparian canopy (Figure 14). The bench at the toe of the slope along Coleman Road will also be planted with riparian species. Oak woodland species will be planted at relatively low elevations where soils are coarse and permeable and contain less moisture. Immediately upstream from the Almaden Expressway Bridge, planting areas will be tapered to ensure that the bridge opening is unobstructed, and existing access to the bridge will be maintained to facilitate maintenance activities.

Instream structures (e.g., rootwads and other IWM, stream barbs, boulders, and v-weirs) will be incorporated into the channel bed and banks to control existing erosion, narrow the low-flow channel, provide cover and instream habitat for fish, and improve hydraulic diversity. Rootwads, barbs, and similar features will also be used to stabilize the bench along Coleman Road and to provide instream cover for fish.

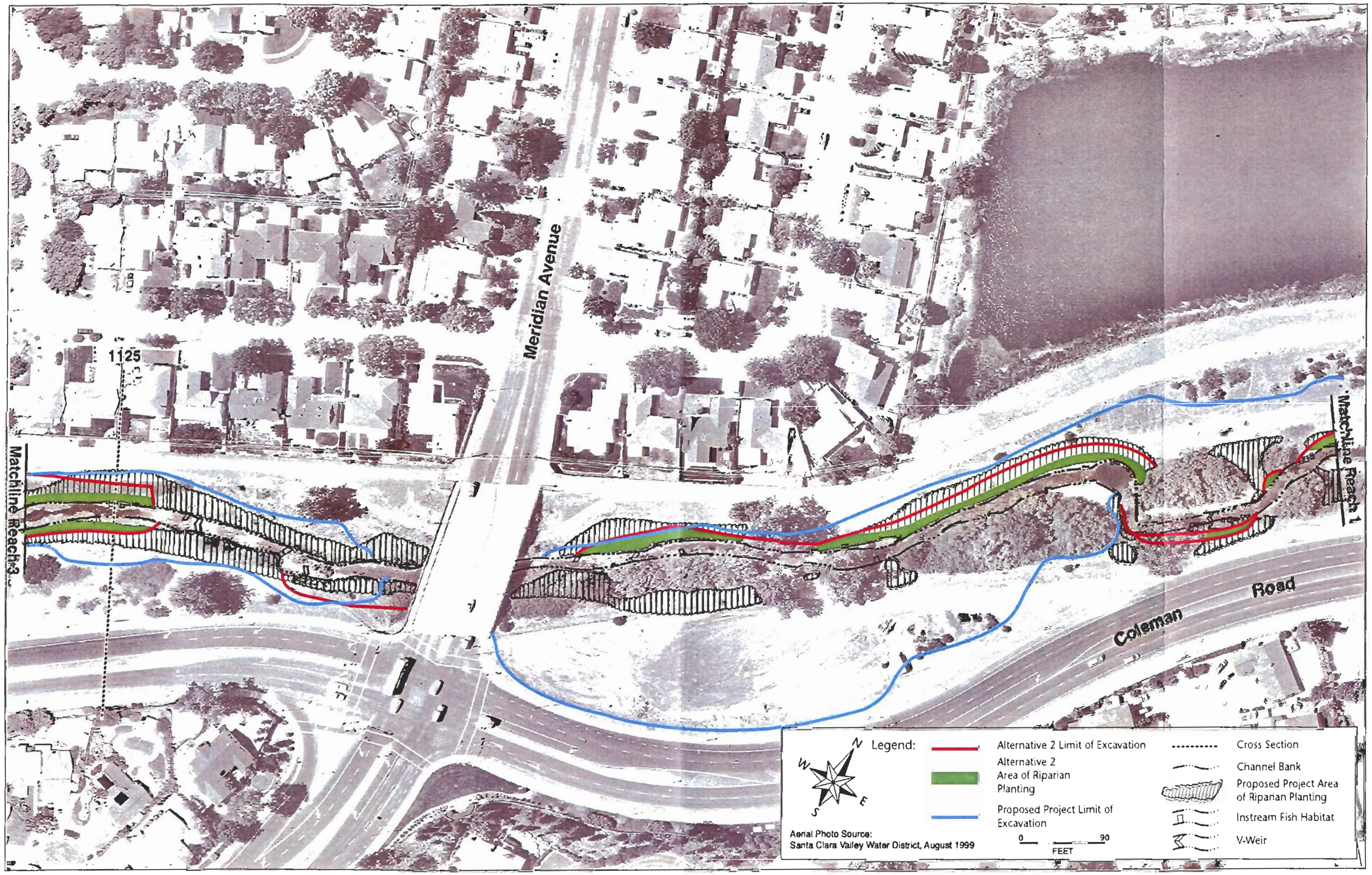
2.4.3.2 Reach 2, Alternative 2

The existing planform of the creek will be maintained in Reach 2 and only minor modifications will be made to lower floodplains in most areas (Figure 15). Instream structures will be installed to improve bank stability, to increase instream cover, and to increase channel complexity and hydraulic diversity in the low-flow channel. Bank stabilization structures will be used on the bend upstream from Meridian Avenue to protect the maintenance road and improve instream cover. Near the downstream end of Reach 2, bank stabilization measures will be installed at the toe of the bank adjacent to Coleman Road.

Planting in Reach 2 will focus on establishing riparian vegetation on the lower floodplain surfaces within the 15-foot zone adjacent to the low-flow channel. Immediately upstream and downstream from the Meridian Avenue Bridge, the planting areas will be tapered to ensure that the bridge opening is unobstructed. Sycamore woodland species will be planted on the north side of the creek immediately upstream from the bridge to ensure that the plantings do not impede floodflows.

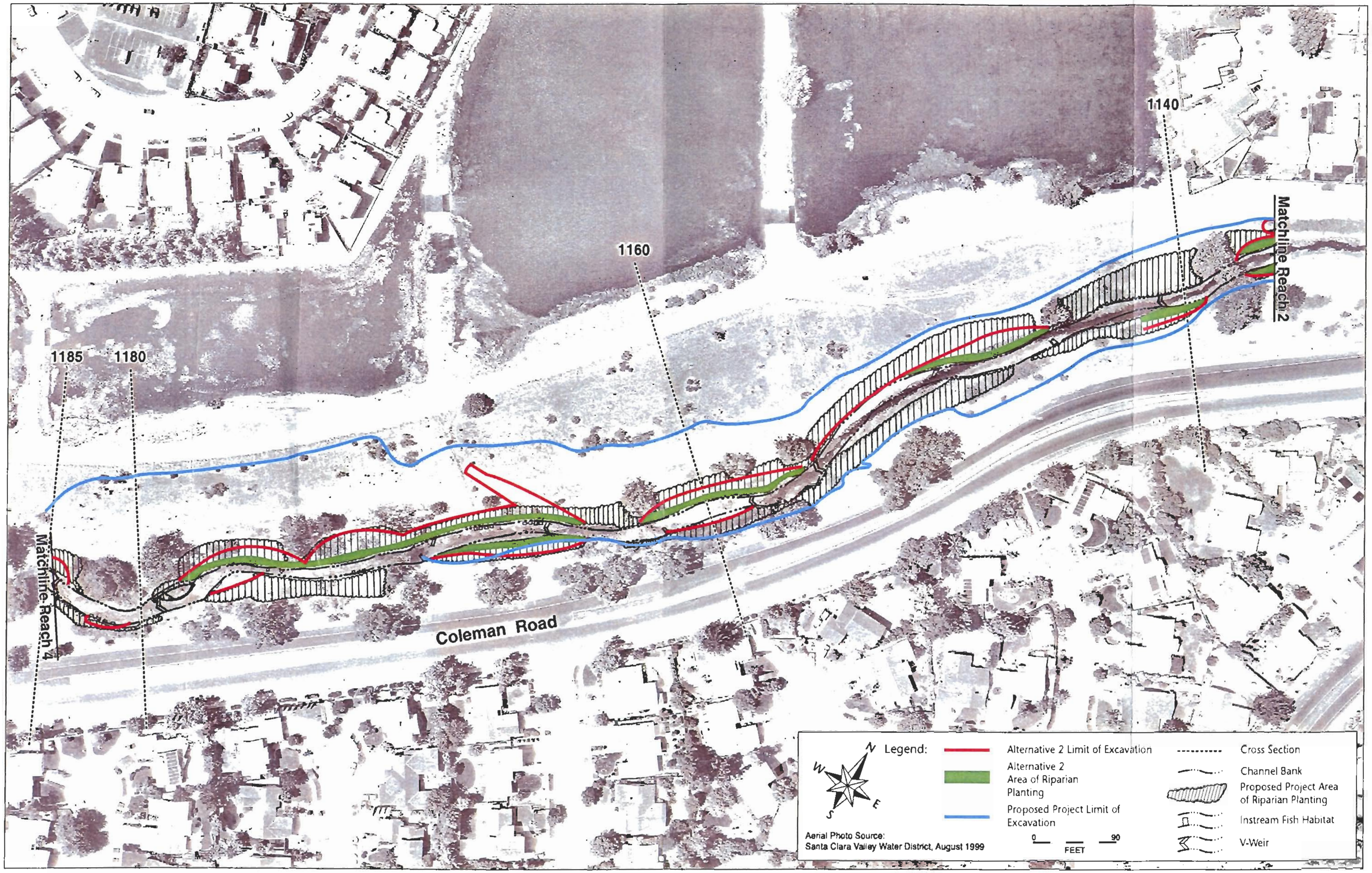
2.4.3.3 Reach 3, Alternative 2

Project features proposed for Reach 3 will focus on modifying the existing floodplain in key areas to provide planting surfaces for riparian vegetation (Figure 16). IWM will be added to stabilize the bed and banks, to increase cover, and to increase channel complexity and hydraulic diversity.


Meridian Avenue
Coleman
Road
1125
Matchline Reach 3
Matchline Reach 1
N
W
E
S
Legend:
Alternative 2 Limit of Excavation
Alternative 2 Area of Riparian Planting
Proposed Project Limit of Excavation
Cross Section
Channel Bank
Proposed Project Area of Riparian Planting
Instream Fish Habitat
V-Weir
0
90
FEET

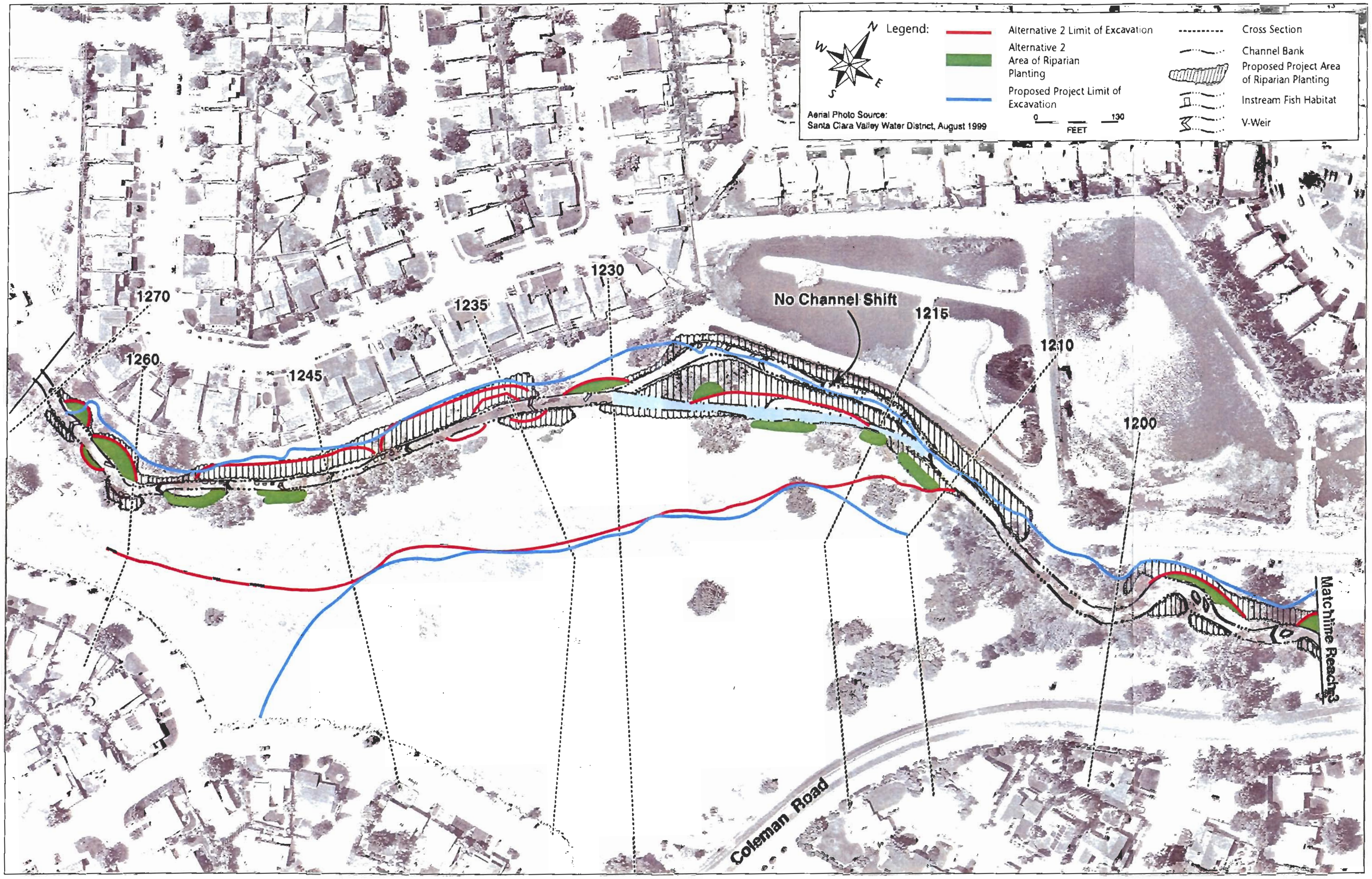
Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 15
Alternative 2 - Reach 2


1140
1160
1185
1180
Matchline Reach 2
Matchline Reach 4
Coleman Road
N
E
S
W
Legend:
Alternative 2 Limit of Excavation
Alternative 2 Area of Riparian Planting
Proposed Project Limit of Excavation
Cross Section
Channel Bank
Proposed Project Area of Riparian Planting
Instream Fish Habitat
V-Weir
0
90
FEET

Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 16
Alternative 2 - Reach 3


N
W
E
S
Legend:
Alternative 2 Limit of Excavation
Alternative 2 Area of Riparian Planting
Proposed Project Limit of Excavation
Cross Section
Channel Bank
Proposed Project Area of Riparian Planting
Instream Fish Habitat
V-Weir
0
130
FEET
1270
1260
1245
1235
1230
No Channel Shift
1215
1210
1200
Matchline Reach 3
Coleman Road

Aerial Photo Source:
Santa Clara Valley Water District, August 1999

Figure 17
Alternative 2 - Reach 4

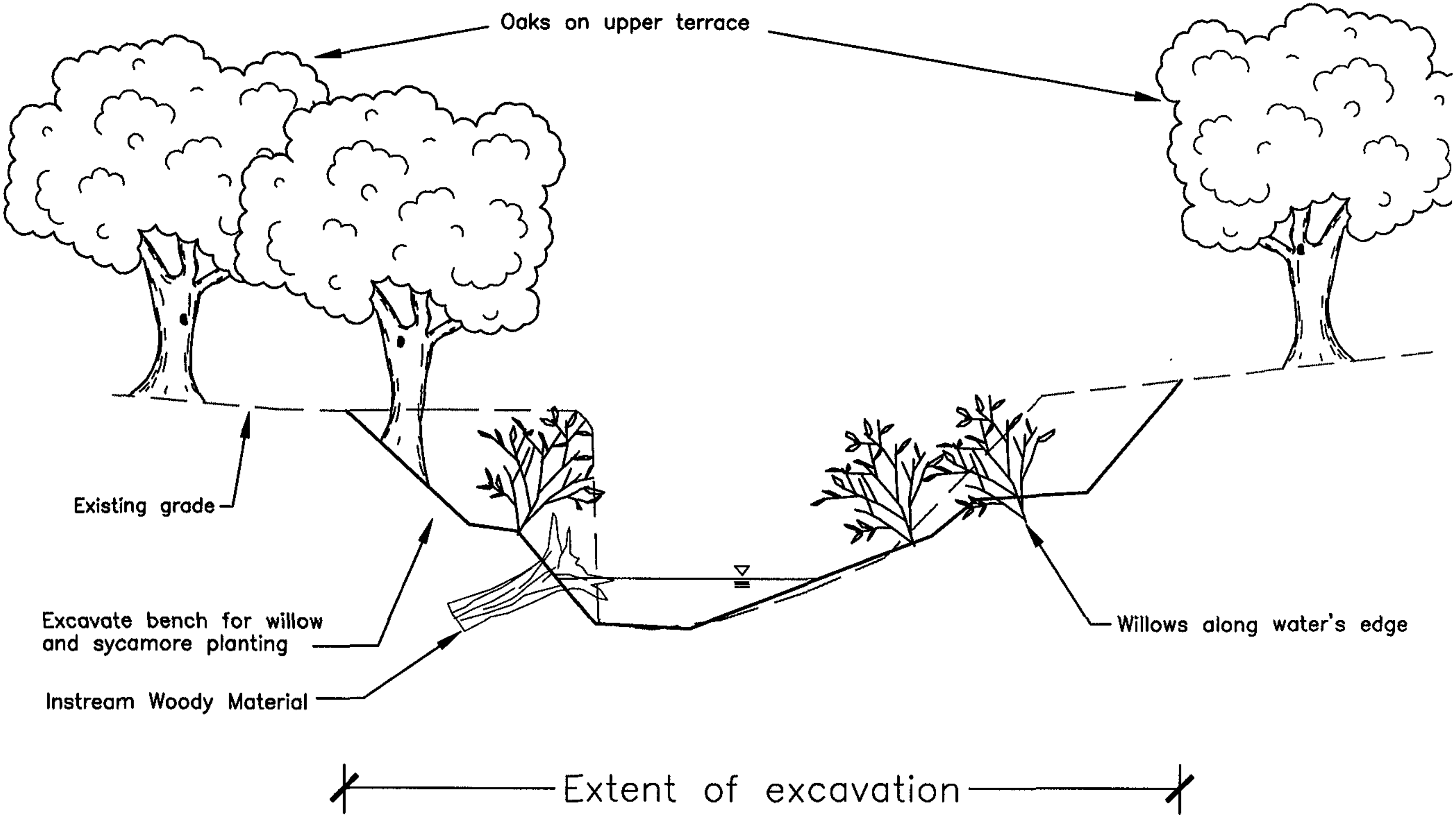


Figure 18
Alternative 2 - Typical Cross Section

Woody material will also be placed on the bar surfaces in Reach 3 to stabilize the bars and provide additional planting sites.

The planting program in this reach will focus on planting riparian vegetation within the 15-foot zone adjacent to the low-flow channel, and on sites created by the installation of bank structures and placement of IWM on the backs of bars. Oak woodland species will be planted on the higher surfaces to fill gaps between existing vegetation.

2.4.3.4 Reach 4, Alternative 2

Under Alternative 2, only minor modifications will be made to the channel in the downstream segment of Reach 4 (Figure 17). Woody material will be placed in an existing erosion cusp to protect the maintenance road, shelter young riparian vegetation, and provide additional planting sites.

The planting program in Reach 4 will focus on planting riparian vegetation and oak woodland species within existing stands of riparian vegetation. Along the south bank of the creek, existing riparian vegetation upstream will be preserved. Additional project features that will be implemented in Reach 4 include installing IWM to provide planting sites on bar surfaces and installing rootwads and other structures to stabilize the outside banks of meander bends and to create instream cover.

2.4.4 No-Project Alternative (Alternative 3)

CEQA compliance requires the analysis of a No-Project Alternative (equivalent to the NEPA No-Action Alternative). The No-Project Alternative assumes "existing conditions" and evaluates the "likely future conditions" in the project area without implementation of the proposed project. Under the No-Project Alternative, no additional riparian and SRA cover habitat would be created and aquatic habitat would not be enhanced within the project area. Water temperatures and aquatic habitat would continue to be less than optimal for anadromous fish species.

2.5 SUMMARY COMPARISON OF ALTERNATIVES AND IDENTIFICATION OF ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 2-1 shows the extent to which the three alternatives meet the objectives developed for the Guadalupe Creek Restoration project, and Table 2-2 provides a summary comparison of the activities proposed under each of the three project alternatives. Factors presented in Table 2-2 include: earthwork, planting, instream habitat features, estimated costs, and potential impacts on existing resources. Chapter 4 (*Environmental Impacts and Mitigation Measures*) presents a more detailed discussion of the potential impacts associated with the alternatives.

Pursuant to the requirements of CEQA and NEPA, the Channel and Floodplain Modification Alternative (proposed project) has been identified as the environmentally superior/environmentally preferable alternative. The environmentally superior/environmentally preferable alternative is the alternative that will result in the least damage to the biological and physical environment and the alternative that will protect, preserve, and enhance historic, cultural, and natural resources while accomplishing the project's objectives. Implementation of the Floodplain and Channel Modification Alternative would meet the primary objective of restoring shaded riverine aquatic (SRA) cover vegetation and improving aquatic habitat for anadromous fish, and would result in a substantial increase in biological resources in the project area. The net benefits to the environment associated with the proposed project—the establishment of 6 acres of riparian vegetation and approximately 13,000 linear feet of SRA cover vegetation—are much greater than those associated with Alternatives 1 and 2. The proposed project also meets the secondary objectives of creating riparian habitat, enhancing aquatic habitat, and restoring natural ecological and physical processes while maintaining existing flood conveyance capacity and minimizing impacts on existing resources. Although implementation of the proposed project would have slightly greater impacts on existing vegetation than the other alternatives, these impacts are relatively minor in comparison with proposed project's expected net benefits to the environment. In addition, features associated with the proposed project (e.g., extensive floodplain excavation) may improve existing mercury-related site conditions (e.g., transport of mercury-bearing sediments, formation of methyl mercury, and mercury bioaccumulation), resulting in a greater net benefit to aquatic habitat and water quality than the other alternatives. Although the No-Project Alternative would result in fewer direct environmental impacts than the proposed project, it would not meet project objectives, nor would it improve water temperatures or provide habitat for anadromous fish species. The selection of the Floodplain and Channel Modification Alternative as the environmentally superior alternative is based on the conclusions of the impact analysis presented in Chapters 4 and 5 of this EIR/EIS. The proposed project also meets the requirements stipulated under Section 230.10(a) of the Clean Water Act for the "least environmentally damaging" alternative.

Table 2-1. Extent to Which the Alternatives Meet the Project Objectives

	Project Alternatives[1]		
	Channel and Floodplain Modification (Proposed Project)	Reduced Channel and Floodplain Modification (Alternative 1)	Minimal Channel and Floodplain Modification (Alternative 2)
Primary Objectives			
Restore shaded riverine aquatic (SRA) cover vegetation and improve aquatic habitat for anadromous fish in lower Guadalupe Creek, between Almaden Expressway and Masson Dam	+++	++	+
Secondary Objectives			
Create 5,971 linear feet of SRA cover vegetation that may serve as offsite mitigation for impacts associated with the Guadalupe River Flood Protection Project	+++	++	+
Create riparian habitat, including SRA cover vegetation, that may provide mitigation credit for future District projects	++	+	+
Enhance or restore habitat for special-status fish and wildlife species, as consistent with other project objectives	+	+	+
Restore physical processes and ecological functions along the project reach of Guadalupe Creek	++	+	+
Protect existing infrastructure in the project area	++	++	+
Maintain existing flood conveyance capacity	+	+	+
Minimize impacts on existing resources	+	+	++
Improve recharge of groundwater aquifers	0	0	0
Minimize long-term operations and maintenance requirements	++	+	+
Minimize impacts on existing water management operations	+	+	++
Design project so that it does not preclude future recreation uses that are compatible with other project objectives	+	+	+
Strive to meet regional planning objectives as outlined in relevant regional planning documents	+	+	+

Notes:

0 = does not meet objective; neutral or minor change from existing conditions.
+ = meets objective
++ = meets objective and provides moderate additional benefits
+++ = meets objective and provides substantial additional benefits.

Names of alternatives differ from those used in Engineer's Report Table 5-1.

Table 2-2. Comparison of Features Associated with the Project Alternatives[a]

	Project Alternatives		
	Channel and Floodplain Modification (Proposed Project)	Reduced Channel and Floodplain Modification (Alternative 1)	Minimal Channel and Floodplain Modification (Alternative 2)
Earthwork			
Channel realignment	2,500 linear feet	1,200 linear feet	300 linear feet
Soil importation	13,000 cubic yards	8,500 cubic yards	7,000 cubic yards
Soil removal and disposal	42,000 cubic yards	31,000 cubic yards	11,500 cubic yards
Fisheries Habitat Improvements			
Rootwads and bar IWM	270 pieces	220 pieces	220 pieces
Stream barbs and buried groins	54 pieces	35 pieces	40 pieces
V-weirs and cross weirs	25 pieces	25 pieces	28 pieces
Bank Protection			
Bank protection	725 linear feet	1,095 linear feet	1,285 linear feet
Total Planting Area			
Riparian vegetation	6.4 acres	4.0 acres	2.3 acres
SRA cover vegetation	13,000 linear feet	9,500 linear feet	6,800 linear feet
Potential Impacts			
Phase 1 plantings	611 linear feet (0.29 acre)	611 linear feet (0.29 acre)	0 linear feet
Riparian vegetation	250 linear feet (0.30 acre)	162 linear feet (0.13 acre)	0 acre
Mitigation Requirements			
Phase 1 plantings (1:1 replacement ratio)	611 linear feet (0.29 acre)	611 linear feet (0.29 acre)	0 linear feet
Riparian vegetation (3:1 replacement ratio)	750 linear feet (0.90 acre)	486 linear feet (0.39 acre)	0 acre
Net Planting Area[b]			
Riparian vegetation	5.21 acres	3.32 acres	0.8 acre
SRA cover vegetation	11,639 linear feet	8,403 linear feet	6,800 linear feet

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[a] Names of alternatives differ from those used in Engineer's Report Table 5-2.

[b] Net planting area represents the acreage and linear feet of SRA cover and riparian vegetation remaining after mitigation of project-specific impacts (Total Planting Area - Mitigation Requirements = Net Planting Area).

Chapter 3. Environmental Setting

The purpose of this chapter is to describe the condition of the physical, biological, and societal environment in the vicinity of the project site at the time the project NOP and NOI were published. Information in this chapter served as the baseline for the lead agencies' evaluation of the potential environmental effects of the proposed project and alternatives. This chapter presents both a local and a regional perspective. However, the areal coverage required for thorough treatment of individual resources varies by resource. Table 3-1 summarizes the areas addressed in the existing conditions discussions in this chapter.

Table 3-1. Area Covered in Existing Conditions Discussions in Chapter 3, by Resource

Resource	Area Covered by Discussion in this Chapter
Biological Resources	Guadalupe River watershed[a]
Cultural Resources	Guadalupe River watershed[a]
Hydrology and Water Quality	Guadalupe River watershed[a]
Geology	Santa Clara Valley and flanking mountain ranges
Seismicity (Seismic Hazards)	Project site
Soils	Project site
Mineral Resources	Guadalupe Creek watershed
Hazardous Materials	Guadalupe Creek watershed
Transportation and Circulation	Regional and local routes accessing the project site
Air Quality	Santa Clara Valley
Noise	City of San Jose and project site
Public Services and Utilities	Project site and immediately surrounding portions of the City of San Jose
Agricultural Resources	Project site and immediately surrounding portions of the City of San Jose
Aesthetics	Project site and immediately surrounding portions of the City of San Jose
Socioeconomics	Santa Clara County and City of San Jose
Environmental Justice	Zip code 95118 (includes the project area)

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[a] Includes the Guadalupe Creek watershed, because Guadalupe Creek is a major tributary of the Guadalupe River.

For some resource areas (e.g., biological resources, hydrology and water quality), this document also discusses conditions in the larger Guadalupe Creek watershed or Guadalupe River system. The terms *project area* and *project site* are used interchangeably throughout this document to refer to the project reach of Guadalupe Creek and immediately adjacent uplands.

3.1 LAND USE AND PLANNING

3.1.1 Existing Conditions

The City—the heart of the Bay Area's "Silicon Valley" high tech nexus—is located in the Santa Clara Valley, which is bounded by San Francisco Bay to the north, the Diablo Range to the east, and the Santa Cruz Mountains to the west. Suburban development extends into the foothills on both sides of the valley. Smaller neighboring cities include Santa Clara, Milpitas, Campbell, Saratoga, and Los Gatos.

Major waterways within the City include the Guadalupe River, Coyote Creek, Los Gatos Creek, Silver Creek, and Penitencia Creek. Guadalupe Creek is a principal tributary of the Guadalupe River (City of San Jose 1994) (Figure 1, Figure 2). The project area is located along Guadalupe Creek between Masson Dam and Almaden Expressway, in the City's Almaden area. In the project area, Guadalupe Creek flows from southwest to northeast, parallel to Coleman Road, which borders the creek's south bank. The creek's north bank is occupied by residential development and by the Los Capitancillos groundwater percolation pond system (Figure 1).

The Guadalupe Creek corridor is currently designated in the City's 2020 General Plan (General Plan)(City of San Jose 1994) as open space; the creek is surrounded by residential land uses. For the most part, the area north of the creek is medium-density residential, but it also includes some apartment complexes (high-density residential), Pioneer High School, and a vacant 1.88-acre parcel owned by the City. The area south of the creek is primarily medium- to low-density residential. A limited amount of development (largely related to the percolation ponds, the maintenance road, and Coleman Road) is directly adjacent to the creek. In addition, one residential development is immediately adjacent to the creek, Le Mirador Senior Apartments at the corner of Coleman Road and Almaden Expressway.

3.2 BIOLOGICAL RESOURCES

3.2.1 Habitat Types

The following discussion of habitat types in and around the project area differentiates habitats based on the dominant types of vegetation present. It uses a classification system that is similar to those of Holland (1986) and Sawyer and Keeler-Wolf (1995) but is tailored to site-specific conditions in the project area. Various habitat types are present in the project area: riverine wetland, gravel bar, open water, percolation ponds, annual grassland, riparian scrub and forest, sycamore alluvial woodland, oak savannah, and upland scrub. Habitats in the project area are constrained in size by surrounding urban development, and the project area has a long history of disturbance as a result of agriculture, channel modification, groundwater recharge efforts, and urbanization. In addition, soils throughout the project area are highly compacted and offer poor surfaces for seed establishment.

3.2.1.1 Riverine Wetland

Riverine wetlands in the project area range from small, narrow, and discontinuous patches along the edges of the low-flow channel of Guadalupe Creek to areas of varying sizes on low-lying benches and bars below the creek's ordinary high-water mark. The instream patches of riverine wetland represent areas where sediment deposition has occurred and enough soil or organic material has accumulated to support hydrophytic vegetation. The project area's riverine wetlands are characterized by perennial emergent marsh vegetation adapted to permanently inundated or saturated soils. The vegetation of the riverine wetlands varies by site but is dominated by a mixture of native and non-native species. Although some patches are dominated by rabbitsfoot grass (*Polypogon monspeliensis*), hairy willow herb (*Epilobium ciliatum*), and nutsedge (*Cyperus eragrostis*), other sites are characterized by willow weed (*Polygonum lapathifolium*), common horsetail (*Equisetum arvense*), water cress (*Rorippa nasturtium-aquaticum*), or spearmint (*Mentha spicata*). Other species common throughout the riverine wetlands include curly dock (*Rumex crispus*), Bermuda grass (*Cynodon dactylon*), and yellow water-primrose (*Ludwigia peploides*). Cattails (*Typha* spp.) are present in patches near the downstream end of the project area. Although many of these species are perennial herbs, they typically die back during winter.

3.2.1.2 Gravel Bar

The project area contains vegetated and unvegetated gravel bars located immediately adjacent to the low-flow channel of Guadalupe Creek. Unvegetated gravel bars are devoid of vegetation and are characterized by gravelly and sandy substrates. Vegetated gravel bars in the project area are characterized by a sparse to dense cover of prickly lettuce (*Lactuca serriola*), horseweed (*Conyza* *canadensis*), Canada thistle (*Cirsium canadense*), cocklebur (*Xanthium strumarium*), Bermuda grass (*Cynodon dactylon*), wild chicory (*Cichorium intybus*), wild fennel (*Foeniculum vulgare*), and nettles (*Urtica* spp.). Seedlings of Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), arroyo willow (*Salix lasiolepis*), and California sycamore (*Platanus racemosa*) are also found on gravel bars. Both unvegetated and vegetated gravel bars are within the ordinary high-water mark and therefore qualify as other waters of the United States under Corps jurisdiction.

3.2.1.3 Open Water

Open water habitat in the project area is found in the low-flow channel of Guadalupe Creek. This habitat type is characterized by a year-round flow of water and is largely devoid of vegetation.

3.2.1.4 Percolation Ponds

Percolation ponds are constructed ponds that provide limited edgewater marsh habitat. Waterfowl, such as mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), bufflehead (*Bucephala albeola*), common merganser (*Mergus merganser*), American coot (*Fulica americana*), and pied-billed grebe (*Podilymbus podiceps*) are commonly seen foraging on the ponds. Aerial fish hunters, such as osprey (*Pandion haliaetus*), Forster's tern (*Sterna forsteri*), and Caspian tern (*Sterna caspia*), have been observed over the ponds. Canada geese (*Branta canadensis*) are commonly seen at the percolation ponds and on the surrounding levees; these ponds may play an important role as a resting site for migrating waterfowl. In addition, red-winged blackbirds (*Agelaius phoeniceus*) and marsh wrens (*Cistothorus palustris*) are common in the limited marsh habitat along the fringes of the percolation ponds.

3.2.1.5 Annual Grassland

The high terraces above Guadalupe Creek are dominated by annual grassland characterized by a mixture of mostly non-native grasses and forbs. Characteristic species include wild oats (*Avena fatua*), Italian ryegrass (*Lolium multiflorum*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), filaree (*Erodium* sp.), smilo grass (*Piptatherum miliaceum*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), wild radish (*Raphanus sativus*), black mustard (*Brassica nigra*), yellow star-thistle (*Centaurea solstitialis*), wild teasel (*Dipsacus fullonum*), wild fennel, scarlet pimpernel (*Anagallis arvensis*), and horehound (*Marrubium vulgare*). Scattered patches of coyote brush (*Baccharis pilularis*) and other upland scrub species are also found in annual grassland habitat.

3.2.1.6 Riparian Scrub and Forest

Riparian scrub in the project area occurs on the terraces above the ordinary high-water mark of the creek. It is dominated by a dense overstory of arroyo willow or narrowleaf willow (*Salix exigua*). Associated species are poison-oak (*Toxicodendron diversilobum*), Himalayan blackberry (*Rubus discolor*), and periwinkle (*Vinca major*). Local patches of mule fat (*Baccharis salicifolia*) are present as well. Although the vegetation that composes the riparian scrub and forest is hydric, the community does not qualify as jurisdictional because it is located on terraces above the creek's ordinary high-water mark and, therefore, lacks indicators of wetland hydrology and hydric soil. Riparian scrub is nonetheless considered a sensitive natural community.

Riparian scrub is used by a variety of bird and mammal species. Dense thickets of blackberry provide excellent cover for ground-foraging birds such as towhees (*Pipilo* spp.) and sparrows. House finches (*Carpodacus mexicanus*) are also commonly seen and heard foraging in the blackberry thickets. Common yellowthroats (*Geothlypis trichas*) use the willow patches along the streamside. Ground squirrels (*Spermophilus beecheyi*) and other small mammals also use these areas for foraging and cover. In the upstream reach below Masson Dam, a single coyote (*Canis latrans*) has been observed on several occasions using the riparian thickets as cover.

Riparian forest is another important component in the project area's mosaic of habitats. The upstream reaches of the project area contain the most continuous areas of riparian forest habitat. Riparian forest is composed of sycamore, Fremont cottonwood, and willow. Critical features include the presence of water, the habitat complexity created by different levels of canopy coverage, and the abundance of foraging areas. Riparian scrub and forest habitat supports abundant aquatic and terrestrial invertebrates that are prey for amphibians, reptiles, small mammals, and insectivorous birds.

3.2.1.7 Sycamore Alluvial Woodland

Sycamore alluvial woodland occurs on the sandy and gravelly terraces immediately adjacent to the creek. Sycamore alluvial woodland in the project area is characterized by an open to dense overstory of California sycamores. These trees remained protected during historic modifications of the streamchannel and are now elevated above the current floodplain. Associated tree species along Guadalupe Creek include valley oak (*Quercus lobata*), arroyo willow, white alder (*Alnus rhombifolia*), California bay (*Umbellularia californica* var. *californica*), coast live oak (*Quercus agrifolia* var. *agrifolia*), and Fremont cottonwood. Shrubs in the understory include mule fat. Sycamore alluvial woodland is considered a sensitive natural community by DFG.

3.2.1.8 Oak Savannah

Most of the upland habitat surrounding Guadalupe Creek is oak savannah. Oaks, sycamores, and coyote brush are common on the upper terraces surrounding the stream. From a habitat standpoint, important features of oak savannahs include cavities in the trees (used by nesting birds) and abundant acorns (a food source for both birds and mammals). Species found in the oak savannah habitat include raptors, snakes, lizards, small mammals, and songbirds. Tall trees provide excellent roosts and perches for hunting raptors. Red-shouldered hawks (*Buteo lineatus*) are commonly seen roosting in the oaks and sycamores along the creek. Acorn woodpeckers (*Melanerpes formicivorus*) have also been observed taking acorns from the oaks. Coyotes have been sighted along the reach just below Masson Dam. Botta's pocket gopher (*Thomomys bottae*) is the most abundant burrowing species in the lower reaches of the project area. Burrowing owls (*Athene cunicularia hypugea*) have not established colonies here because of the lack of ground squirrel burrows.

3.2.1.9 Upland Scrub Habitat

The upland scrub habitat in the project area includes several large patches of blackberry bramble (composed entirely of Himalayan blackberry), as well as patches of coyote brush and introduced ornamental shrub species. Although Himalayan blackberry qualifies as a marginally hydrophytic species, the blackberry bramble at the site is not considered jurisdictional because it occurs on terraces above the creek's ordinary high-water mark.

3.2.2 Phase 1 Restoration Plantings

Phase 1 of the Guadalupe Creek Restoration Project was implemented in 1998 to compensate for impacts on SRA cover vegetation that resulted from the construction of portions of the Guadalupe River Project. The Phase 1 planting site is located in Reach 4. Plantings were installed on existing benches along both sides of the creek, beginning 660 feet downstream from Masson Dam and continuing downstream for approximately 780 feet. The Phase 1 site comprises a total of 1,263 linear feet of plantings.

Phase 1 plantings include the following:

- trees (*Acer negundo*, *Aesculus californica*, *Alnus rhombifolia*, *Platanus racemosa*, *Populus fremontii*, *Salix laevigata*, *Salix lasiolepis*, *Quercus douglasii*, and *Quercus lobata*);

- shrubs (*Baccharis salicifolia*, *Rosa californica*, *Salix exigua*, and *Sambucus mexicana)*; and
- herbaceous vegetation (*Artemesia douglasiana).*

3.2.3 Special-Status Species

Based on a search of the Natural Diversity Data Base (NDDB) for the Santa Teresa Hills and Los Gatos 7.5' quadrangles and a review of pertinent literature, approximately 13 special-status plant species and 11 special-status wildlife species have the potential to occur within the project area or project vicinity. However, no special-status species have been observed within the boundaries of the project area, presumably because of the disturbed nature of the Guadalupe Creek project area. Appendix A contains lists of special-status species that are known to occur and that may occur within the project area.

California red-legged frogs (*Rana aurora draytonii*) historically occurred within the Guadalupe Creek watershed. There are a number of NDDB records for red-legged frogs within Santa Clara County (Natural Diversity Data Base 1999), with several occurring in the Guadalupe River watershed. The closest NDDB observation to the proposed project site was recorded in 1989 in Los Gatos Creek, approximately 1.5 miles upstream of Lexington Reservoir. Additionally, a number of red-legged frog observations were recorded in the Guadalupe River watershed between 1904 and 1980 (U.S. Army Corps of Engineers 1999). Three of these historic red-legged frog observations were recorded in Guadalupe Creek upstream of the proposed project site (1973, 1977, and before 1980) (H.T. Harvey & Associates 1997).

Extensive survey coverage of the proposed project area by District, USFWS, and contracted biologists has not resulted in additional red-legged frog sightings in the Guadalupe Creek watershed within the past several years. H.T. Harvey & Associates recently prepared a report on red-legged frog occurrences throughout Santa Clara County, including the Guadalupe Creek watershed. Based on general locational data in the H.T. Harvey report, there are no extant red-legged frog populations in the proposed project area (H.T. Harvey & Associates 1997).

Burrowing owls are not known to be present in the project area. Habitat disturbance has prevented ground squirrels from establishing colonies in the area. Because burrowing owls have a commensal relationship with the ground squirrel, they are also unable to become established in the area.

3.2.4 Fisheries

This section describes existing conditions for aquatic habitat in the project area. It emphasizes steelhead and chinook salmon and their habitat. Steelhead are listed as threatened under the federal Endangered Species Act (ESA) and chinook salmon are a federal candidate species. As part of the Central California Coast ESU for steelhead, the segment of Guadalupe Creek downstream of Guadalupe Reservoir has been designated by NMFS as critical steelhead habitat.

3.2.4.1 Fish Occurrence

3.2.4.1.1 Steelhead. Steelhead in the Guadalupe River basin (including the project reach of Guadalupe Creek) are considered part of the Central California Coast ESU. Only winter-run steelhead occur in the Central California Coast ESU (61 FR 41541–41561, August 9, 1996). Generally, adult steelhead within this ESU start to enter rivers from October (in larger basins) through late November (in smaller basins) and may be present in the Guadalupe River system through June. Adult spawning begins in November in larger basins and December in smaller basins and can continue through April, with a peak in February and March (61 FR 41541–41561, August 9, 1996). Because little additional information exists on the life history of steelhead in the Central California Coast ESU, the following summary is drawn from Shapovalov and Taft (1954), who conducted one of the most comprehensive investigations of steelhead life history in the Central California Coast ESU as part of studies conducted on Waddell Creek in Santa Cruz County.

Adult steelhead leave the ocean to migrate up coastal streams and inland rivers with high flows from early November through early May, though the majority probably enter fresh water from late December through late April. The timing and rate of migration depend on several factors, including stream discharge and water temperature. Depending on the sexual maturity of the fish, spawning probably peaks from January through March. Adult steelhead spawn in shallow redds (nests) constructed in relatively clean, loose gravel, typically at the end of pools and at the head of riffles that have appropriate water depths and velocities. Unlike all Pacific salmon, which die after spawning, steelhead are capable of returning to the ocean after spawning, typically by June of that same year (Shapovalov and Taft 1954).

Steelhead eggs incubate within the streambed gravel and hatch in 19–80 days. Incubation time is related to water temperature; if water temperature is ~60 °F, hatching typically occurs in ~19 days, while it may take as much as 80 days at 40 °F. The average incubation period is approximately 4–6 weeks. After hatching, the young fish (alevins) remain in the gravel for an additional 2–6 weeks before emerging and taking up residence in the shallow margins of the stream. Juvenile fish feed primarily on aquatic and terrestrial insects for periods ranging from less than 1 year to as much as 4 years (Shapovalov and Taft 1954).

Most juvenile steelhead spend 1–3 years in fresh water before emigrating to the ocean as smolts. Before their downstream migration, juveniles undergo physiological changes (smoltification) that prepare them for life in the ocean. Steelhead smolts, juveniles sufficiently developed to live in saltwater, typically migrate to the ocean as flow declines and water temperature increases in April, May, and June. Steelhead live in the ocean for 1–3 years before maturing and returning to fresh water to spawn (Shapovalov and Taft 1954).

Because juvenile steelhead rear year-round in fresh water, adequate flows, appropriate water temperatures, and an abundant food source are necessary throughout the year to sustain steelhead populations. Conditions adequate to sustain steelhead populations are especially important during summer, when declining flows can reduce habitat availability, water temperatures may exceed the species' tolerance levels, and rearing juveniles experience increased competition for living space and food. It is not known whether juvenile steelhead rear throughout the summer in the Guadalupe River, where summer water temperatures often exceed 70°F (Shapovalov and Taft 1954).

Historically, steelhead may have existed throughout the Guadalupe River system (Skinner 1962); however, after completion of Almaden and Guadalupe Reservoirs in the mid-1930s and Lexington Reservoir in 1952, steelhead migration was restricted to tributary streams downstream of the dams and the size of steelhead runs in the Guadalupe River declined progressively (Skinner 1962). No specific data exist on trends in steelhead abundance after 1962.

Until fall 1999, steelhead entering the Guadalupe River system were prevented from migrating to upstream spawning and rearing areas on tributary streams by the District's Alamitos drop structure, located near Blossom Hill Road. The Alamitos drop structure was originally constructed in the 1930s and was reconstructed in 1977. After its completion, steelhead entering the Guadalupe River system were forced to spawn in the lower reaches of the Guadalupe River and in Los Gatos and Ross Creeks. The Alamitos drop structure blocked salmonid fish passage until the construction and opening of the Alamitos fish passage ladder in 1999. With the fish ladder in place, steelhead are now thought to be reextending their range into Guadalupe Creek upstream to Guadalupe Reservoir.

Rainbow trout in Guadalupe Creek may be part of the Central California Coast ESU for steelhead. In the 1950s, DFG documented the presence of rainbow trout in Guadalupe Creek from Camden Road upstream to Guadalupe Dam, in Pheasant Creek, and in Rincon Creek (upstream of Guadalupe Reservoir) (Leidy 1984). In December 1986, The Habitat Restoration Group collected rainbow trout at three sites along Guadalupe Creek between the District's stream gage station on Hicks Road and a point approximately 1 mile downstream of Guadalupe Reservoir. Rainbow trout were collected from lower Guadalupe Creek both upstream and downstream of Masson Dam in the early 1990s (The Habitat Restoration Group 1994). In 1997, rainbow trout were collected at the District's stream gage station on Hicks Road in May and immediately downstream of Masson Dam in July. In general, rainbow trout in Guadalupe Creek appear to be most abundant from Guadalupe Reservoir downstream to Camden Avenue (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000).

3.2.4.1.2 Chinook Salmon. Although there is no historic account of chinook salmon migrating and spawning in the Guadalupe River, fall-run chinook salmon have been found in the Guadalupe River at least during the last decade. The current chinook salmon population may be strays from wild or hatchery populations in the Sacramento-San Joaquin River system (The Habitat Restoration Group 1994, Santa Clara Valley Water District and U.S. Army Corps of Engineers 1997). The results of a genetic analysis of these fish conducted to determine their origin were inconclusive, though some adults were clearly from the Sacramento River watershed (Nielsen 1995). The Central Valley fall-/late fall ESU includes fall- and late fall-run chinook salmon that spawn in the Sacramento and San Joaquin River drainages of the northern Central Valley. The overall population abundance for chinook salmon in this ESU is relatively high; however, the abundance of naturally produced fish is declining. Natural production is especially low in the San Joaquin River drainage (63 FR 11481, March 9, 1998).

Adult fall-run chinook salmon migrate into rivers from July through December and spawn from early October through late December. All chinook salmon require cold freshwater streams with suitable gravel for reproduction. Females deposit their eggs in redds (spawning depressions) that they excavate in the gravel bottom in areas of relatively swift water. Spawning peaks in October and November, though the timing of the runs varies from year to year. Eggs incubate from October through March, and juveniles rear and smolts emigrate from January through June. Eggs hatch in approximately 6–12 weeks, and newly emerged larvae remain in the gravel for another 2–4 weeks until the yolk is absorbed. For maximum survival of incubating eggs and larvae, water temperatures must be between 41 and 57°F. After emerging, chinook salmon fry tend to seek shallow nearshore habitat with slow water velocities; they move to progressively deeper and faster waters as they grow. Juveniles may rear in fresh water for as much as 5 months before migrating to the ocean. Chinook salmon then spend 2–4 years maturing in the ocean before returning to their natal streams to spawn. Adult salmon die after spawning (Moyle 1976, Beauchamp et al. 1983, Allen and Hassler 1986, Raleigh et al. 1986).

Chinook salmon now migrate up the Guadalupe River and, to a lesser extent, Los Gatos Creek to spawn. Data on spawning adult abundance are limited. Chinook are known to spawn from above the influence of tidewater upstream to the project area, though the majority of chinook appear to spawn in and around the downtown San Jose area.

3.2.4.1.3 Other Species. In addition to steelhead and chinook salmon, a number of other native and introduced fish species are known to occur within the project area. Native species include Pacific lamprey (*Lampetra tridentata*), Sacramento sucker (*Catostomus occidentalis*), and California roach (*Hesperoleucus symmetricus*). Introduced species include goldfish (*Carassius auratus*) and green sunfish (*Lepomis cyanellus*). Introduced largemouth bass (*Micropterus salmoides)* are also suspected to occur within the project area because they are found upstream in Guadalupe Reservoir and downstream in the Guadalupe River. Crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), green sunfish, and largemouth bass are also suspected to be present in the percolation ponds adjacent to the site.

Several non-native species, including largemouth bass and other sunfishes, may compete with steelhead and chinook salmon for food or suitable habitat and may prey on salmonid larvae and juveniles. The vulnerability of juvenile salmonids to predation increases near human-made structures such as dams, weirs, and impoundments, where fish are concentrated, stressed, or delayed in their downstream migration. Vulnerability of juvenile salmonids to predation can also increase if changes in water temperature regime (such as warmer water temperatures) or changes in channel structure result in conditions that increase the abundance of predatory fish.

3.2.5 Habitat Structure

3.2.5.1 Overhead Cover

Riparian vegetation, including SRA cover vegetation, provides fish with:

- cover from predators;
- streambank stability;
- increased habitat complexity;
- attachment sites for insects that serve as a food source for juvenile salmonids; and
- shade, which is important in maintaining water temperatures within ranges suitable for all life stages of fish.

The amount of stream shading (the area of the stream covered by overwater vegetation) varies considerably within the project area. In general, stream shading is very low on Guadalupe Creek; approximately 12% of Guadalupe Creek's stream area is shaded by canopy. This lack of canopy cover has increased stream temperatures throughout the project area to unhealthy levels.

3.2.5.2 Instream Cover

Instream cover is an important component of fish habitat. Instream cover includes: undercut banks with an undercut width greater than 10 cm; roots, logs, and debris piles greater than 1,000 square cm (cm^2) in surface area; and boulders and rocks greater than 20 cm in diameter (Jones & Stokes 1997, Fris and DeHaven 1993). Wood and boulders add complexity by defining the thalweg, scour pools, and slow-water eddy habitat.

Steelhead abundance correlates directly with the amount of instream cover (Raleigh et al. 1984). Cover for adult steelhead consists of areas of obscured stream bottom in water at least 15 cm deep with a velocity of at least 15 cm per second. In larger streams, the abundance of steelhead that are at least 15 cm long increases with water depth; most steelhead are found at depths of at least 15 cm. Cover over at least 25% of the total stream area is adequate for adult steelhead. Cover over more than 15% of the total stream area is adequate for juveniles (Raleigh et al. 1984).

IWM plays an important role in the ecological function of headwater streams. Ecologists define IWM as any piece of wood at least 10 cm in diameter at the small end and at least 1.5 meters in length. IWM includes whole trees, broken tops, branches, and rootwads. Larger pieces are more likely to affect streamchannel morphology, and entire trees with rootwads make a greater long-term contribution to instream habitat and channel morphology. IWM provides primary and secondary productivity, is integral to fish habitat, and controls sediment yield in watersheds. IWM also provides grazing surfaces, food, and sediment and seston (i.e., minute organic and inorganic particle) traps for invertebrates. During high flows, sediments are trapped and stored within or behind IWM, providing additional spawning gravels for anadromous fish.

Large, fallen trees affect live vegetation along watercourses. Trees carried by floodwater can severely batter live plants on a floodplain but this typically occurs only in a narrow belt along the immediate channel. On the other hand, large, stable pieces of wood protect riparian sites, enabling alders and other plant species to become established.

Live vegetation eventually stabilizes a streamchannel. Both channel banks and instream features such as gravel bars are stabilized and enriched with fine sediments and organic materials as plant root systems develop and their stems resist the flow of water and reduce its velocity (Sedell et al. 1988). In the project area, establishment of willows and alders has been slow, possibly because of stream incision, depth to groundwater, and channelization for flood protection. In addition, high flows may scour young willows and alders away.

Habitat complexity in the project area is low because existing IWM is too small to remain in place and actively enhance habitat and geomorphology. Currently, live sycamore root masses that have been exposed by flows are an important part of the woody material system in the project area. These root masses have contributed to the formation of large scour pools and provide good habitat for juvenile and adult salmonids (see discussion in *Pool Habitat* section below).

Undercut banks also occur throughout the project area. Approximately 110 linear feet of streambank in the project area is undercut more than 10 cm. Undercut banks on Guadalupe Creek are generally associated with live sycamore root masses that have contributed to the formation of large scour pools. This combination of root mass and undercut bank offers excellent habitat for both adult and juvenile salmonids.

3.2.5.3 Pool Habitat

Pools form around any material that creates friction and turbulence and resists displacement by flowing water. Although virtually everything in the channel creates friction, including the stream bottom and sides, the dominant pool-forming elements are IWM, boulders, and bedrock protrusions (Dolloff 1994). Table 3-2 describes the different types of pools that can be found in streams.

Table 3-2. Pool Types and Design Considerations

Pool Type	Position in Channel	Process Creating the Pool	Design Consideration	Habitat Notes
Lateral scour pool	Outside of bend on a curved reach	Created by flows around curves; scour confined to 60% or less of wetted width	Create with instream structures	Provides feeding and resting stations for adults and juveniles
Straight scour pool	At gradient break or channel constriction	Created by mid-channel scour; 60% or more of wetted width	Create with IWM complex	Provides feeding and resting stations for adults and juveniles
Backwater eddy pool	Along the stream edge	Formed downstream from large obstructions, such as boulders and logs	Create pool >30 cm deep with IWM or boulders	Provides feeding and resting stations for adults and juveniles
Pocket pool	In riffles and runs	Formed by medium to large boulder clusters midstream	Create with boulders within the wetted width	Provides feeding and resting stations for adults and juveniles
Alcove pool	Remnant channel or side channel	Formed in blocked or dried remnant outflow channel; maintained by subsurface flow and eddy current	Create at outflow of created flood overflow channels or created side channels	Provides excellent juvenile salmon rearing habitat
Plunge pool	Across all or part of the channel	Formed by flow over obstructions such as logs	Depth should be 1.25 x (jump height) where obstruction may block fish passage	Could be juvenile barrier if >24 cm high

Pools offer varying amounts and qualities of escape cover, winter cover, and rearing and resting area. Relatively large, deep pools are needed to provide a low-velocity resting area for adult fish. Ideally, more than 20% of the pools should have bottoms obscured by surface turbulence or by features such as logs, debris piles, boulders, or overhanging banks and vegetation. For both chinook salmon and steelhead, the optimal percentage of stream area that consists of pools ranges from 35% to 65% during the late-growing, low-water season (Raleigh et al. 1984, 1986).

Approximately 23% of the total stream area within the project area consists of pools. Pools in the project area are predominantly lateral scour pools and are considered fair habitat. As mentioned above, some of the larger pools are eddy pools created by the large root masses of live sycamores. Deep-bodied introduced fish such as sunfish cannot withstand high flows and would normally be flushed out of the system during periods of high flow. However, deep-bodied fish may find cover from high flows in the bottoms of large pools, and several of the pools in the project area may be deep enough to prevent introduced species from being flushed out of the system.

3.2.5.4 Riffle and Run Habitat

Riffle habitats are shallow, fast-water areas with broken surfaces and are important spawning and food resource areas for adult and juvenile steelhead. For optimal spawning, approximately 5–10% of the riffle area should be composed predominantly of gravels 5–10 cm in diameter that contain less than 15% fine material (material <2 cm in diameter). The optimal gravel diameter for food production is 3.25 cm (U.S. Army Corps of Engineers 1990). The velocity for best food production is between 1 and 3 feet per second (fps) at depths of 0.4–1 foot. A base flow greater than or equal to 50% of the annual daily base flow is considered excellent for maintaining quality steelhead habitat, a base flow between 25 and 50% is considered fair, and a base flow less than 25% is considered poor (Raleigh et al. 1984).

Run habitat is characterized by uniform depth and comparatively swift streamflow with little or no surface turbulence. Runs typically lack major flow obstructions. Habitat values and characteristics of runs are intermediate between those of riffles and pools; runs commonly appear as flooded riffles. Typical substrate in runs consists of gravel (diameter=0.08–2.5 inch), cobbles (diameter=2.5–10 inches), and boulders (diameter >10 inches) (Flosi et.al 1998). The term *run* is equivalent to the U.S. Forest Service usage of *glide*.

In the Guadalupe Creek project area between Almaden Expressway and Masson Dam, the proportions of riffles and runs are 31% and 46%, respectively. Under existing conditions, many of the riffles are too shallow and have water temperatures in excess of the lethal temperatures for steelhead. Flows within the project area during the summer low-flow period are approximately 0.5 cubic feet per second (cfs) at Almaden Expressway. Adult migration may be blocked through several reaches until flows reach 5–7 cfs. During the October–April spawning period, only 25% of the days have flows high enough to allow fish migration. Analysis of flows and channel morphology indicates that passage conditions and accessability of spawning habitat in Guadalupe Creek are generally better for adult steelhead than for chinook salmon. The majority of adult steelhead are expected to be present in the Guadalupe River drainage from December through April, whereas adult chinook salmon may be present from June through January.

3.2.5.5 Spawning Gravel

The size and quality of substrate materials are primary factors in salmonid spawning success. Adult chinook salmon and steelhead require relatively clean gravels in which to lay their eggs. For spawning, chinook salmon require substrates 0.5–10 inches deep dominated by cobbles 1–3 inches in diameter. Steelhead use gravels 0.5–6 inches deep dominated by cobbles 1–3 inches in diameter. Gravels containing a high proportion of fine sediments (i.e., sand- and silt-sized particles) can interfere with the flow of water and oxygen to the eggs in the gravel and reduce hatching success. Fine sediments can also hinder or prevent young salmonids emerging from gravels after they have hatched.

Substrate is also critical to the production of aquatic insects and thus to the survival of juvenile fish. Optimal substrate size and area are based on substrates containing the greatest number of aquatic insects, use by small juvenile steelhead, and gravel providing for adequate water exchange and proper nest construction (Raleigh et al. 1984, 1986). Substrate used as winter cover by rainbow trout fry and small juveniles ranges from 10 to 40 cm in diameter. An area of substrate greater than 10% of the total habitat probably provides adequate cover for rainbow trout fry and small juveniles. The use of smaller substrates as winter cover will increase mortality of young fish because finer-grained materials are more likely to shift in the stream's current (Dolloff 1994).

Spawning habitat within the project area is considered poor because substrates are generally embedded and shallow. However, a few pockets of gravels offering good spawning habitat do occur within the project area.

3.2.5.6 Water Temperature

Water temperature is affected by weather, reservoir operations, streamflow, tributary inflow, groundwater, and physical habitat, including shading by riparian vegetation. Water temperature is an important variable that determines the suitability of fish habitat, especially for chinook salmon and steelhead, which have relatively narrow temperature tolerances. Each life stage of chinook salmon and steelhead has different physiological responses to water temperature conditions. Table 3-3 (following page) presents the thermal requirements for key life stages of chinook salmon and steelhead, based on information from the published literature (Raleigh et al. 1984, 1986). In general, as optimal water temperatures are exceeded, chinook salmon and steelhead experience increased stress, resulting in greater susceptibility to disease, reduced growth, and increased mortality.

Table 3-3. Temperature Requirements (°F) for Life Stages of Chinook Salmon and Steelhead during the Months Those Species are Present in Guadalupe Creek

Life Stage	Chinook Salmon	Steelhead
Pre-spawning adults	August–December	November–April
Optimal	46.4–53.6	44.0–57.0
Suboptimal	53.6–75.2	57.0–65.0
Unacceptable	>75.2	>65.0
Egg incubation	October–March	January–May
Optimal	41.0–57.2	44.6–53.6
Suboptimal	57.2–60.8	53.6–60.8
Lethal	>60.8	>60.8
Juvenile rearing	January–June	All Months
Optimal	53.6–64.4	53.6–64.4
Suboptimal	64.4–75.2	64.4–77.0
Lethal	>75.2	>77.0
Juvenile emigration	February–June	January–July
Optimal	53.6–64.4	44.6–59.9
Suboptimal	64.4–75.2	59.9–66.2
Unacceptable	>75.2	>66.2

Sources: Shapovalov and Taft 1954; Moyle 1976; Raleigh et al. 1984, 1986; Rich 1987.

Because steelhead are coldwater fish that rear in streams for as much as 3 years, summer temperature is the most critical for their success. Optimum rearing temperatures for steelhead range from 54 to 64°F, with an upper lethal temperature of 77°F. Optimum water temperatures for steelhead incubation are between 45 and 54°F, with an upper lethal temperature of 61°F (Raleigh et al.1984).

Appropriate water temperature for spawning, incubation, and juvenile rearing is also essential for the survival of chinook salmon. Mature female chinook salmon exposed to water temperatures above 60°F for prolonged periods experience poor survival and produce fewer viable eggs than females exposed to lower water temperatures (Hinze 1959). Maximum survival of incubating eggs and yolk-sac larvae occurs at water temperatures between 41 and 57°F (Moyle 1976, Beauchamp et al. 1983, Allen and Hassler 1986, Raleigh et al. 1986). As water temperature exceeds 57°F, incubating eggs begin to suffer increased mortality; water temperatures greater than 61°F are lethal. Juvenile chinook salmon may tolerate water temperatures from 32 to 75°F, but the optimum range for survival and growth, provided an adequate food supply exists, is between 54 and 64°F (Raleigh et al. 1986).

Stream temperature is the most important factor limiting the success of both steelhead and chinook in the project area. The lack of canopy cover has increased stream temperatures throughout the area to levels that are hazardous to steelhead and chinook salmon during much of the year. The maximum stream temperature recorded at Almaden Expressway (at the downstream end of the project area) is 87 °F, recorded in July. The maximum stream temperature recorded at Masson Dam (at the upstream end of the project area) is 71 °F, recorded in October. In Guadalupe Creek, limiting water temperatures occur during summer rearing. Summer rearing temperatures in Guadalupe Creek range from 51 to 86 °F degrees at Almaden Expressway and from 50 to 70 °F at Masson Dam.

3.3 CULTURAL RESOURCES

3.3.1 Prehistory and Ethnography

The Santa Clara Valley and surrounding areas are the traditional home of the Ohlone, who are believed to have inhabited the area since about A.D. 500. The territory of the Ohlone extended along the coast from San Francisco Bay in the north to the vicinity of Carmel in the south, and as much as 60 miles inland. Historically, the Ohlone have been called Costanoans, from the Spanish word *costaños*, meaning "people of the coast."

The Ohlone were hunter-gatherers and relied heavily on acorns and various seafoods for subsistence. They also used a wide range of other natural resources for food, shelter, and the production of material goods. These resources included: plant materials, including various seeds, berries, and roots; land and sea mammals; waterfowl; reptiles; and insects. The Ohlone are known to have made a range of lithic and bone tools, as well as balsas (small watercraft constructed of reeds), bows and arrows, cordage, sea otter blankets, and twined basketry. Minerals were used as coloring agents in body paints; hematite and cinnabar yielded red pigment and white was obtained from clay. Like many native Californians, the Ohlone practiced controlled burning to promote the growth of seed-bearing annual plants and increase the available grazing areas for deer, elk, and antelope (Levy 1978).

3.3.2 History

The Guadalupe River system is the focus around which development in the Santa Clara Valley area has prospered. When Spanish explorers traversed the area in 1769 and 1775 in search of appropriate locations for the establishment of presidios, missions, and pueblos, they followed the Guadalupe River through the Santa Clara Valley. Their path became well-traveled and is an important local link in *El Camino Real*, the historic route connecting the missions of Baja and Alta California.

3.3.2.1 Mining Activities

Deposits of the mercury ore cinnabar approximately 7 miles south of the City were known and used by Native Americans for red pigment. In 1824, the hill containing these deposits was prospected for silver and gold; at this time, it was known as *La Mina Santa Clara*. In 1845, Andres Castillero, intending to develop the mine, filed a claim with the Mexican government. Castillero soon discovered that the mine was a source of mercury ore (Hart 1978). The mine was renamed the New Almaden Mine and became the largest of the mines in the Guadalupe River watershed; the mine site is located on lands that are now part of the 4,000-acre Almaden Quicksilver County Park, owned by the Santa Clara County Parks and Recreation Department. Additional mines in the area included the Guadalupe Mines, located upstream of the project area. The Guadalupe Mines site is the present location of the Guadalupe landfill.

Mercury, traditionally called quicksilver, is a critical component in the gold smelting process. When the California Gold Rush created an enormous demand for quicksilver, the New Almaden Mine quickly became one of the most famous and productive mercury mines in the world, yielding approximately $1 million annually. The large mine operations required an enormous workforce, which took up residence in small townships around the mine. The New Almaden Mine continued to operate intermittently until the 1970s (Hart 1978).

3.3.3 Cultural Resources Investigation

A search of records held at the Northwest Information Center at Sonoma State University was conducted on November 15, 1999. Records reviewed at the information center included:

- the database of previously conducted studies and previously recorded sites within a 0.25-mile radius of the project area;
- the NRHP;
- California Points of Historical Interest; and
- General Land Office Maps dated 1860, 1879, and 1880.

The records search revealed that the entire project area has been surveyed for cultural resources in a number of previous investigations (Archaeological Resource Management 1989, Cartier et al. 1994, Kelly 1988, Laffey 1990, Roop 1987). These surveys resulted in the identification of two sites within the project area, CA-SCL-186 and CA-SCL-187.

Both CA-SCL-186 and CA-SCL-187 are prehistoric. CA-SCL-186 was first recorded in 1974 and consisted of a single Franciscan flake. CA-SCL-187 was first recorded in 1974 and consisted of one oyster shell. Both CA-SCL-186 and CA-SCL-187 were test-excavated to evaluate their significance according to NRHP criteria. These excavations revealed neither additional prehistoric artifacts nor any midden soils, and neither of the sites was found to be significant (Cartier et al. 1994). SHPO has concurred that neither site is eligible for listing in the NRHP (Abeyta pers. comm.).

3.3.4 Native American Consultation

It is unclear whether any consultation with Native Americans was conducted during the previous cultural resource studies within the project area; as a result, Jones & Stokes initiated consultation with interested parties for this project. In response to Jones & Stokes' inquiries, the Native American Heritage Commission indicated that they knew of no religious or traditional sites within the project area and sent us a list of interested Native Americans to contact for further information. Jones & Stokes sent a letter to these individuals briefly apprising them of the project and its location and asking them to contact us with information or concerns regarding religious or traditional sites in the area.

Three individuals, representing the Muwekma Indian Tribe and the San Juan Bautista Band of Ohlone/Costanoans, responded to our letter and expressed concern regarding the sensitivity of the area for Native American sites. Jones & Stokes sent these three individuals detailed information on the findings of previous studies, as well as a detailed map showing the location of the project area. One of the individuals responded that she would like to meet in person to discuss her concerns. That meeting was scheduled for March 10, 2000, in the City. However, the representative was unable to attend at the last minute because of a family emergency. Jones & Stokes contacted her and requested that she send her concerns in writing as soon as possible. No further correspondence was received from her, either by mail or telephone. Another of the individuals requested a meeting in Sacramento to discuss the project. However, the individual did not attend the scheduled meeting for unknown reasons.

3.4 HYDROLOGY AND WATER QUALITY

3.4.1 Surface Waters

3.4.1.1 Surface Water Hydrology and Water Management

Guadalupe Creek originates in the foothills of the Santa Cruz Mountains and drains a watershed of approximately 15 square miles in the southern County (Figure 1, Figure 2), receiving additional input in the form of urban runoff. From its headwaters, the creek flows in a generally northeastward direction to join Alamitos Creek, forming the Guadalupe River. Major tributaries to Guadalupe Creek include Rincon Creek, Los Capitancillos Creek, and Pheasant Creek. Because of the area's Mediterranean climate, characterized by well-developed wet and dry seasons, surface flow to Guadalupe Creek is extremely variable (climate and precipitation in the Guadalupe Creek watershed are discussed in the *Air Quality* section below). Flow in the creek is also greatly affected by the operation of facilities for water storage, importation, and diversion.

Guadalupe Reservoir, located approximately 4 miles upstream from the project area, captures flows from Guadalupe, Los Capitancillos, and Rincon Creeks and regulates approximately 6 square miles of the creek's upper watershed. The reservoir was constructed by the District in 1935 and has a total capacity of 3,228 acre-feet. It is operated primarily to provide flows for groundwater recharge in the Los Capitancillos percolation ponds and in the bed of Guadalupe Creek in the project area. The reservoir also provides ancillary flood control benefits for the downstream region. In order to prevent the damage that can result from uncontrolled spilling, the District periodically releases water from Guadalupe Reservoir to prevent overtopping of the dam's emergency spillways. Water releases are based on storage levels, rates of inflow, and weather forecasts.

Masson Dam marks the immediate upstream end of the project area. The dam is operated by the District to regulate the diversion of flows from Guadalupe Creek into the Los Capitancillos percolation ponds. During the flood season, flashboards at Masson Dam are removed if Guadalupe Reservoir reaches capacity. They are routinely reinstalled at the end of the flood season in April. As needed, water can be either imported to or exported from Guadalupe Creek at Masson Dam via the Almaden Valley pipeline. Flows diverted from the Almaden Valley pipeline to the Guadalupe water distribution system are regulated and measured at a turnout located upstream from Masson Dam. Flow diversions to and from the creek below Masson Dam are not gaged; they are estimated on a daily basis by maintenance and operations personal (Aguilera pers. comm.). These estimates are reviewed in order to approximate mean monthly diversion volumes and assess the water balance within the distribution system. Flows in the creek below Masson Dam are typically regulated to maintain flows of approximately 3–4 cfs at Masson Dam and approximately 0.5 cfs at Almaden Expressway.

HEC-RAS hydraulic modeling was conducted for this project, in order to simulate flow depth and velocity profiles at numerous cross sections on the project reaches for the flood events with 1.5-, 2-, 5-, 10-, 50-, and 100-year recurrence intervals under existing conditions. In general, modeling results suggest that events with recurrence intervals less than 10 years are confined to the main channel and are not subject to backwater effects of bridges or other flow-constricting features. However, events with recurrence intervals greater than 5 years are expected to overtop the main channel upstream of Masson Dam, flow over the northwest corner of the Los Capitancillos Wetland Project Site and re-enter the creek channel approximately 200 feet below Masson Dam. The 50- and 100-year flood events are expected to spread out onto higher benches within the channel, remaining within the broader floodplain (Jones & Stokes 1999, Jones and Stokes 2000d). These results are consistent with Federal Emergency Management Agency-approved flood insurance rate maps (FIRM maps) depicting the limits of the 100-year flood event.

3.4.1.2 Quality of Surface Waters in the Guadalupe Creek System

3.4.1.2.1 Water Quality Context for Guadalupe Creek. Surface water quality in small streams depends primarily on:

- the mineral composition of the soils and associated parent materials in the watershed,
- the hydrologic and hydraulic characteristics of the stream and its watershed, and
- the types of contaminant sources present in the watershed and stream corridor.

In general, the water quality characteristics of greatest importance to fish and wildlife are temperature, turbidity, growth of "nuisance algae," concentrations of dissolved oxygen and of biostimulatory nutrients such as nitrogen and phosphorus, and presence of toxic constituents, including heavy metals and un-ionized ammonia.

No routine water-quality monitoring is performed on Guadalupe Creek at present, and with the exception of the results of the analyses performed for this project (presented in the following section), very little water quality information is available for the creek. The project area includes high- and medium-density urban residential developments as well as rural, open-space, and undeveloped mountainous areas. Thus, potential contaminants in the system are diverse.

3.4.1.2.2 Sampling and Analysis Conducted for this Project. A preliminary water quality study was performed in September 2000 to establish a baseline understanding of water quality in and upstream from the project reach of Guadalupe Creek (Tetra Tech pers. comm.). Water samples were collected from eight sites within the project reach and four upstream sites. For the most part, samples were collected in midstream at middle depths. Analyses followed standard laboratory procedures for each constituent analyzed. Table 3-4 summarizes the results of the water quality analyses.

Table 3-4. Summary of Guadalupe Creek Water Quality Data, September 2000

Parameter	Minimum	Maximum	Mean
Project Reaches			
pH	6.5	8.1	7.7
Conductivity (mS)	0.340	0.360	0.339
Temperature (°C)	14.0	19.8	17.4
Dissolved Oxygen (mg/l)	4.40	11.4	9.09
Turbidity (NTU)	0	55	25
Suspended Solids (mg/l)	<10	13	<10
Dissolved Organic Carbon (mg/l)	<1	1.17	<1
Total Organic Carbon (mg/l)	<1	1.36	<1
Methyl Mercury (ng/l)	0.315	0.934	0.570
Total Mercury (ng/l)	11.6	73.9	32.0

Parameter	Minimum	Maximum	Mean
Upstream from Project Reaches			
pH	8.0	8.2	8.1
Conductivity (mS)	0.303	0.308	0.306
Temperature (°C)	14.7	15.6	15.0
Dissolved Oxygen (mg/l)	4.44	5.47	5.04
Turbidity (NTU)	2.0	16	6.5
Suspended Solids (mg/l)	NA	NA	NA
Dissolved Organic Carbon (mg/l)	<1	1.12	<1
Total Organic Carbon (mg/l)	<1	<1	<1
Methyl Mercury (ng/l)	0.720	1.610	1.035
Total Mercury (ng/l)	38.6	1380	403.8

Abbreviations:
mS milliSiemens
mg/l milligrams per liter
NA not available
NTU nephelometric turbidity unit
ng/l nanograms per liter

Source: Tetra Tech pers. comm.

Because of the concern regarding mercury contamination of water, soil, and sediments in the project area, the September 2000 study also analyzed12 samples of sediment from the active low-flow channel of Guadalupe Creek within and upstream from the project reach. Analyses were performed on dried samples and followed standard laboratory procedures. Table 3-5 summarizes the results of these additional analyses.

Table 3-5. Summary of Mercury Content in Guadalupe Creek Streambed Sediments, September 2000

Parameter	Minimum	Maximum	Mean
Methyl Mercury (μg/g)	0.0004	0.0420	0.0055
Total Mercury (μg/g)	0.350	31.70	11.10

μg/g = micrograms per gram, dry weight
Source: Tetra Tech pers. comm.

The September 2000 water quality study performed for this project included analyses of porewaters in the upper 2 cm of sediment in the bed of Guadalupe Creek's active low-flow channel. Samples were collected at the same sites used for water sampling. Table 3-6 presents the results of sediment porewater analyses.

Table 3-6. Summary of Mercury Content in Porewaters and Upper 2 cm of Guadalupe Creek Streambed, September 2000

Parameter	Minimum	Maximum	Mean
Methyl Mercury (ng/l)	0.16	60.6	12.6
Total Mercury (ng/l)[b]	18.5	91.5	36.4

ng/l = nanograms per liter
Source: Tetra Tech pers. comm.

At most of the sample sites, methyl mercury content in shallow porewaters was markedly higher than that in creek waters from the same site. This suggests that mercury methylation may be occurring in situ in the shallow sediment column. The greatest increases in methyl mercury content were measured at sites in Reaches 1 and 2. Two of these sites are downstream from areas supporting abundant vegetation; although data on organic content in the sediment column are not available at this time, increased organic content in the shallow sediment column may contribute to in situ methylation.

Finally, in order to assess biologic uptake of mercury from creek waters and/or sediments, the September 2000 study also analyzed the mercury content of emergent and submergent vegetation from project reach and upstream sample sites. Five samples were collected within the project reaches and one sample was collected upstream from the project site. Samples included filamentous green algae, spikerush (*Eleocharis* sp.), and water cress. All samples were analyzed for total mercury and moisture content; three samples, representing the range of total mercury concentrations measured, were then analyzed for methyl mercury content. Table 3-7 summarizes the results of these analyses.

Table 3-7. Summary of Mercury Content in Guadalupe Creek Plant Samples, September 2000

Parameter	Minimum	Maximum	Mean
Methyl Mercury (μg/g)	0.018	0.093	0.048
Total Mercury (μg/g)	0.23	5.32	2.14

μg/g = micrograms per gram, dry weight
Source: Tetra Tech pers. comm.

3.4.1.2.3 Implications of Elevated Mercury Levels in Guadalupe Creek Waters. Elevated mercury levels in the Guadalupe River watershed are in large part a legacy of the California gold mining era, when mercury was used in the gold refining process (see discussion under *Cultural*

Resources). Mines such as the New Almaden Mine, which operated for many years in the upper watershed extracting the mercury ore cinnabar, are known to be a source of mercury in the Guadalupe River system. Leaching of mine tailings and overland transport of mercury-bearing sediments have resulted in the downstream accumulation of mercury in the watershed.

Most mercury in the freshwater environment is chemically bound to suspended particles of soil or sediment; a smaller fraction is bound to dissolved organic carbon. Sediment-bound mercury may still be available to aquatic organisms and thus remains a pollutant of concern. The potential for adverse environmental effects from sediment-bound mercury depends primarily on transport and depositional characteristics (e.g., particle size), and the physical and chemical properties of the sediment. Additionally, sediment-bound mercury may be converted through both biotic and abiotic processes to its more bioavailable methylated form.

The greatest concern with regard to the accumulation and transport of mercury in the watershed is the potential for mercury methylation. Methyl mercury is readily adsorbed by aquatic plants, fish, and wildlife, and has been demonstrated to accumulate in their tissues. Factors conducive to methylation of mercury include: low flow or stagnant waters, hypoxic or anoxic conditions in the water column, low pH (< 6), and high concentrations of dissolved carbon. Most of these factors are in turn affected by biological processes such as metabolism, growth, and decay.

Because methylation is affected by changes in physical and biological conditions, it is likely that the rate and quantity of methyl mercury formation changes seasonally; seasonal variation in flow velocity and volume probably also contribute to variation in methylation rates. During the winter rainy season and subsequent spring flushing period, streamflow is high and rapid and even in the deepest pools turbulent overturn of the water column likely keeps the water well oxygenated. Because oxygen is more soluble in water at lower temperatures, cooler winter water temperatures are also expected to foster oxygenation throughout the water column. By contrast, during the warm, dry summer months, flow volumes drop significantly and the creek's deep pools may approach a stagnant condition, decreasing oxygenation of bottom waters; warmer summer water temperatures may also reduce oxygenation. These conditions typically intensify throughout the course of the summer and fall dry season. During the late summer and fall, methylation may thus occur in deep, slow-moving pools in the creek's main channel and possibly also in pools that form when minor channels become isolated and stagnant

Although the waters of Guadalupe Creek are generally fairly well-oxygenated and moderately alkaline (Table 3-4), the results of the September 2000 water quality analyses clearly indicate that methylation of mercury occurs upstream from the project site under existing conditions and imply that it may occur within the project reaches as well. Methyl mercury content in project reach waters varies markedly between sample sites. Some or all of this variation likely results from biologic uptake of methyl mercury (e.g., Table 3-7) and/or demethylation and evaporation of mercury. However, variation probably also reflects local mercury methylation within the project reaches.

3.4.2 Geomorphology

In the project area, the Guadalupe Creek floodplain has been modified by gravel mining, by construction of levees and percolation ponds adjacent to the creek, and by urbanization (e.g., construction of roads, bridges, and housing developments). The floodplain has also been altered by a flood control project that included channel grading, deepening, and widening. In the upstream reaches of the project area, Guadalupe Creek is deeply incised and has near-vertical cutbanks, largely as a result of these past alterations combined with natural fluvial processes; over the past 60 years, there has been a general trend toward channel degradation in the upper reaches of the project area (Jones & Stokes 2000d). Toward the downstream end of the project area, the channel is less incised and widens onto a broader floodplain.

The project site is divided into four geomorphically distinct reaches: Reach 1, Reach 2, Reach 3, and Reach 4 (Figure 3). The following paragraphs identify key geomorphic characteristics of each reach.

3.4.2.1 Reach 1

Reach 1 is 3,280 feet long and is located at the downstream end of the project area from Almaden Expressway to approximately 1,000 feet below Meridian Avenue (Figure 4). Reach 1 is characterized by large, alternating gravel bars that create a broad channel bottom; the gravel bars store sediment and act as sites for future sediment deposition. Because of the gravel bars, flow is wide and shallow at relatively low flows. Reach 1 also contains a broad floodplain bench approximately 5 feet above the channel bed. The bench was constructed during the 1972 flood corridor expansion. On the south side of Reach 1, a steep slope rises more than 10 feet from the channel floor, and includes only a few intermediate bench surfaces. Reach 1 has the least tree cover of the four geomorphic reaches.

3.4.2.2 Reach 2

Reach 2 is 1,460 feet long and spans a short section of the project area from the southwest side of the Meridian Avenue Bridge to the northeast side of the bridge (Figure 5). Unlike Reach 1, Reach 2 has no large gravel bars. The channel cross section is much more confined and the flood corridor narrows to a width of about 150 feet where the creek passes between residential development and Coleman Avenue immediately upstream from the Meridian Avenue Bridge. This narrowing is the result of development on the north side of the creek that prevented widening of the flood corridor during the 1972 flood corridor expansion. Reach 2 is characterized by small intermediate-level benches that alternate between the left and right banks.

3.4.2.3 Reach 3

Reach 3 is 1,500 feet long. Its dominant feature is a very wide floodplain bench on the north bank (Figure 6). The bench extends over the whole length of the reach and is 7–8 feet above the channel bed on average. It was constructed during the 1972 flood corridor expansion. Six large trees on the bench were preserved in 1972 by grading around them, leaving raised mounds as high as 5 feet in the upstream part of the reach. The elevation of the mounds identifies the former ground surface. The south bank of Reach 3 slopes more steeply and is as much as 12–20 feet above the channel bed, rising to the elevation of Coleman Road. Reach 3 has significantly more tree cover than Reaches 1 and 2.

3.4.2.4 Reach 4

Reach 4 is 2,400 feet long and is located at the upstream end of the project area, immediately downstream from Masson Dam (Figure 7). The channel in Reach 4 is entrenched 10 feet or more. Its cross section is narrow and confined by comparison with the other reaches. Reach 4 has a few small intermediate-level benches, but over most of the reach the channel banks are steep-sided. This type of cross section results in greater confinement of floodflows and allows for higher sediment-transport capacity than in downstream reaches. At the time of the field survey for this IS/EA, the former Masson Dam had been removed to permit construction of the new fish ladder and dam. The field study documented some erosion of sediments that had accumulated behind the former dam. Reach 4 exhibits more abundant tree cover along the riparian corridor than any of the downstream reaches.

3.4.3 Groundwater

3.4.3.1 Overview

The Santa Clara Valley groundwater basin has been extensively investigated and is actively managed for conjunctive use via the District's artificial recharge operations in the upper Coyote Creek and Guadalupe River basins. The groundwater basin is the primary source of drinking water for domestic supply to residential communities and industrial/commercial uses in the Santa Clara Valley. The northern portion of the groundwater basin extends approximately 20 miles inland from the South Bay and comprises a shallow unconfined aquifer and a deeper confined aquifer (California Department of Water Resources 1975). The primary area of natural recharge to the deeper confined aquifer is called the forebay and is generally located adjacent to the hills that form the perimeter of the basin. Guadalupe Creek overlies a region of the forebay that is recharged by releases from Guadalupe Reservoir.

Because of the District's artificial recharge operations, groundwater levels in the project area are affected by streamflow. However, the proposed project would maintain existing streamflow in the area and is thus not expected to result in any impacts on groundwater resources. Therefore, no survey of local well owners was conducted for this study.

3.4.3.2 Groundwater Hydrology

Field surveys conducted for this study have delineated the groundwater profile in the project area. Throughout most of the project area, groundwater elevations decrease significantly relative to surface-water elevations with increasing distance from the main channel; that is, the groundwater profile is "losing" over most of the project area. The gradient of the losing groundwater profile within 85 feet of the main channel averages approximately 13% but is generally steeper in the downstream sections (Reaches 1 and 2) of the project area than in the upstream sections (Reach 4). In some portions of the project area, groundwater elevations increase, increase slightly, or remain nearly level relative to surface-water elevations with increasing distance from the main channel; that is, the groundwater profile is level or slightly "gaining" in parts of the project area. Field data indicate that level and slightly gaining groundwater profiles occur primarily in Reach 3. Ground-surface elevations increase with increasing distance from the main channel along the entire project area. Consequently, the depth to groundwater can be significant in both losing reaches and gaining reaches.

Losing groundwater profiles also predominate upstream of the project area between Masson Dam and Camden Avenue. However, the gradients of losing groundwater profiles in the upstream area are significantly less steep than those in the project area. This difference may in part explain the nearly continuous growth of riparian vegetation in the upstream area when compared to the project area.

3.4.3.3 Groundwater Quality in the Project Area

The quality of shallow groundwater is largely dependent on the quantity and quality of surface water that percolates into the ground and on subsequent chemical interactions that take place in the subsurface. Factors that affect the susceptibility of shallow groundwater to contamination include the type of soil or other water-bearing materials in an aquifer, the permeability of subsurface materials to surface-water infiltration, the locations of pollutant sources, and the depth to the aquifer(s). The shallow unconfined aquifer beneath the Santa Clara Valley has isolated areas of historical groundwater pollution associated with industrial contaminants.

3.5 GEOLOGY AND SOILS

3.5.1 Geology

The project area is located in the southwestern portion of the Santa Clara Valley in the Coast Range physiographic province (Bailey 1966). Topography in and around the Santa Clara Valley is largely controlled by major strands of the San Andreas fault system, and by contractile (thrust) faulting associated with uplift of the California Coast Ranges. Bedrock exposed in the Santa Cruz Mountains near the project area includes Mesozoic Franciscan Complex sandstone and marine sedimentary rocks of Miocene age; the Santa Cruz Mountains are bordered by an apron of Pleistocene alluvium recording uplift of the range. East of the valley, the core of the Diablo Range uplift consists of Franciscan Complex rocks (sandstone, chert and ultramafic rocks), overlain by and faulted against Miocene marine and terrestrial sedimentary rocks. Like the Santa Cruz Mountains, the Diablo Range is flanked by a broad apron of Pleistocene alluvium. South of the project area, low hills situated where the valley narrows along U.S. Highway 101 are primarily composed of Franciscan chert, ultramafic rocks, and sandstone (Wagner et al. 1990). The valley itself is a thickly alluviated structural low that formed concomitant with uplift of the flanking ranges during the last several million years (e.g., Coyle 1984).

The project area is situated on alluvium of Holocene age. The site is characterized by a series of gently sloping Quaternary alluvial/fluvial landforms (Wagner et al. 1990) that extend laterally from the active channel of Guadalupe Creek. No unique geologic features occur within the boundaries of the project area.

3.5.2 Seismicity

Although Bortugno et al. (1991) recognized two faults that show evidence of late Quaternary displacement (10,000–70,000 years ago) in the northeastern end of the project area, no active faults have been identified within the project area, and the site is not located within an Earthquake Fault Zone as defined by the State of California for active faults (Hart and Bryant 1997). Thus, the risk of primary seismic hazards such as earthquake-related ground rupture in the project area is considered low. However, the project area is situated in close proximity to several major active fault zones, including the Hayward and Calaveras fault zones to the east and the San Andreas fault zone to the west. All are 8 miles or more from the project area, but an earthquake on any of these faults could produce severe ground shaking in the project area. Ground shaking could trigger liquefaction; conditions conducive to liquefaction (specifically, the presence of clean, loose, saturated gravelly, sandy, or silty soils within 50 feet of the ground surface) are known to exist in the project area. Liquefaction may result in differential ground settlement and more extensive lateral spreading, which can damage overlying structures and utilities.

3.5.3 Soils

Maps included in the published soil survey of the County (Soil Conservation Service 1968) show two soil units in the project area: Yolo silty clay loam and Garretson gravelly loam. The Yolo silty clay loam consists of silty clay loam and silt loam alluvium to depths of more than 5 feet and is mapped primarily at the western and eastern ends of the project area. The Garretson gravelly loam consists of loam and sandy loam alluvium to a depth of 40 inches and stratified sands and gravels from 40 inches to depths of more than 5 feet. It is mapped over the remaining portions of the project area. According to the Soil Conservation Service (SCS) survey (1968), some of the soils located within the project area have moderate shrink-swell potential; they may be considered expansive under the Uniform Building Code.

Detailed soils data collected during field investigations conducted by Jones & Stokes soil scientists were used to create a first-order soil survey map of the project area (i.e., a minimum delineation of 1 acre or less) (Jones & Stokes 1999). Results of the Jones & Stokes first-order survey differ from and amplify the findings of the SCS in the following ways:

- The Yolo soil and soils that are morphologically similar to the Yolo soil are generally absent from the project area. Jones & Stokes staff observed soils that are morphologically similar to the Garretson soil, soils not identified in the SCS survey in the project area, and disturbed and/or fill materials.
- Jones & Stokes staff documented the presence of a wider range of soil textures in the project area than the SCS survey reports.
- Anthropogenic materials (e.g., plastic, concrete, tires) were observed at various depths in surface and shallow subsurface materials throughout the project area, suggesting the presence of disturbed and/or fill materials rather than native soils.
- Weakly cemented, loamy soil horizons not described in the SCS survey were observed at depth on several streambank cuts in the western, upstream portion of the project area.

In addition, soils in the project area are typically highly compacted.

The SCS (1968) describes runoff in the area as slow to very slow and the hazard of erosion as slight to nonexistent, primarily because of the gentle gradients that prevail throughout most of the project area. Observations made during the Jones & Stokes field investigations are generally consistent with this assessment. However, the gently and moderately sloping surfaces that occur between floodplains and terraces may experience slightly higher runoff rates and may be subject to a greater erosion hazard than the level or nearly level landforms that dominate the project area. Sloughing, unvegetated, and eroding streambanks, which occur discontinuously along the project reach, likely serve as the greatest local source of sediment to Guadalupe Creek. Streambanks are also the only areas subject to potential mass movements.

3.5.4 Mineral Resources

The project area and vicinity are classified as "Mineral Resource Zone 3 (MRZ-3) sand and gravel" by the California Division of Mines and Geology (California Division of Mines and Geology 1987). Areas are identified as MRZ-3 if they contain mineral deposits whose significance cannot be evaluated based on available data. The streambed and terrace deposits of Guadalupe Creek and its tributary, Los Gatos Creek, were once extensively mined for sand and gravel; as discussed in *Land Use*, these surfaces are now occupied by urban development and groundwater percolation ponds (California Division of Mines and Geology 1987, City of San Jose 1994).

In addition, the Guadalupe Creek watershed once supported large-scale mercury mining operations, as discussed in *Cultural Resources* and *Hazardous Materials*. Mercury mining was discontinued in the 1970s.

3.6 HAZARDOUS MATERIALS

3.6.1 Overview of Known and Potential Hazardous Materials in the Project Vicinity

The Guadalupe Creek project site and the surrounding area historically supported agricultural and rural residential uses; current land uses include urban residential development and the Los Capitancillos percolation ponds, which are used for groundwater recharge (U.S. Geological Survey 1940, U.S. Geological Survey 1953, U.S. Geological Survey 1961a, U.S. Geological Survey 1961b, City of San Jose 1994). Because of the area's history of agricultural use, residual pesticides may be present in soils and sediments in and around the Guadalupe Creek project site. In addition, as discussed in the *Hydrology and Water Quality* section above, mercury contamination is widespread in the Guadalupe River watershed. Elevated mercury levels in the region are largely a legacy of the California gold mining era, when mercury was used in the gold refining process (see *Cultural Resources* section).

Previous studies have shown that mercury concentrations in sediments from different parts of the Guadalupe River watershed vary widely. For example, sediment sampling efforts conducted in the mid-1990s found that mercury concentrations in approximately 70 channel sediment samples from sites within the watershed ranged from 0.05 to 49 mg/kg (CH2M HILL 1994, CH2M HILL 1995). The majority of these samples had mercury concentrations below 10 mg/kg, and one of the samples contained no detectable mercury. However, two samples had mercury concentrations of 22 mg/kg and 49 mg/kg, respectively. More recent sampling on the lower Guadalupe River between Highway 237 and Blossom Hill Road (below Almaden Expressway) documented mercury concentrations ranging from 0.05 to 0.46 mg/kg in a suite of ten samples (Tetra Tech 2000 and pers. comm.).

3.6.2 Sampling and Analysis Conducted for this Project

In the Guadalupe River watershed, the sediments of greatest concern from a hazardous materials standpoint are those that were transported and deposited along the banks of downstream tributaries as a result of historic mining activities. Because of the potential presence of these sediments in the project area, the District initiated a sampling program to characterize the distribution of mercury in soils and sediments of surfaces that will be modified as part of the proposed project, and to identify soil disposal considerations (Tetra Tech 2000). During June and July 2000, 50 sediment samples were collected from the proposed project site, from the proposed Los Capitancillos freshwater wetland mitigation site located on the south side of the creek adjacent to Coleman Road, and from the upstream creek segment below Camden Avenue. Table 3-8 summarizes the results of preliminary analyses of these samples.

Table 3-8. Results of June–July 2000 Mercury Analyses of Bank Soils at Proposed Project Site

Location (depth)	Surface	-6 Inches	-2 Feet	-5 Feet	-10 Feet
Reaches 1–4:					
Number of samples		26	10	2	2
Mean concentration		19 mg/kg	19 mg/kg	24 mg/kg	13 mg/kg
Highest concentration		65 mg/kg	69 mg/kg	24 mg/kg	18 mg/kg
Lowest concentration		3.8 mg/kg	0.72 mg/kg	23 mg/kg	7.6 mg/kg
Los Capitancillos Site:					
Number of samples	6	2	2		
Mean	8.5 mg/kg	6.9 mg/kg	5.7 mg/kg	N/A	N/A
Highest concentration	160 mg/kg	12 mg/kg	9.9 mg/kg		
Lowest concentration	1.1 mg/kg	1.8 mg/kg	1.4 mg/kg		

mg/kg = milligrams per kilogram
N/A = not applicable
Source: Tetra Tech 2000.

An additional ten samples were collected in conjunction with the September 2000 water quality sampling program (six from the project site and four from upstream localities). Table 3-9 (following page) summarizes the results of analyses performed on these samples.

Table 3-9. Results of September 2000 Mercury Analyses of Bank Soils

Parameter	Minimum	Maximum	Mean
Project Reaches			
Total Mercury (mg/kg)	3.0000	27.500	11.783
Upstream Sites			
Total Mercury (mg/kg)	46.700	203.00	100.45

mg/kg = milligrams per kilogram, dry weight
Source: Tetra Tech pers. comm.

The results of the June–July 2000 analyses demonstrate that mercury concentrations in bank and terrace materials vary widely between sample localities and sampling depths. Sixteen of the 40 sediment samples collected from Reaches 1–4 showed concentrations above 20 mg/kg (the total threshold limit concentration for mercury); concentrations in those samples ranged from 21 to 69 mg/kg. Along Reaches 1–4, there appears to be little to no difference in average mercury concentration between the 6- inch and 2-foot sampling depths. Sparse data collected to date suggest that mean concentrations increase at a depth of 5 feet and then decrease again at a depth of 10 feet; however, only two samples were taken at -5 and -10 feet in Reaches 1–4. One sample from the Los Capitancillos site also exceeded the total threshold limit concentration for mercury, with a concentration of 160 mg/kg. At the Los Capitancillos site, average total mercury concentrations generally decrease with increasing depth.

Results of the September 2000 analyses of bank materials from sites in and upstream from the project reaches are similar to the June–July results and confirm the variability of mercury content in Guadalupe Creek bank soils. Five of the September samples showed mercury levels in excess of the 20 mg/kg total threshold limit criterion, although only one of these was taken from the project reach. Moreover, based on the September analyses, mercury concentrations in bank materials appear to be consistently higher than those in instream sediments, although the difference between bank and instream mercury content is greater in the upstream samples (Tetra Tech pers. comm.).

3.7 TRANSPORTATION AND CIRCULATION

3.7.1 Overview

3.7.1.1 Operation of Roadways

As roadways traverse the jurisdictions of various cities and counties, maintenance of each segment is undertaken by the appropriate city or county public works department. In the project vicinity, the Santa Clara County Roads and Airport Department has primary responsibility for the Almaden Expressway, and the City's Department of Public Works has primary responsibility for Blossom Hill Road, Meridian Avenue, and Coleman Road.

3.7.1.2 Level of Service

The quality of service provided by a roadway is expressed as its *level of service* (LOS). This method uses a letter rating to describe the peak-period driving conditions for a particular facility. The letters A through F represent progressively worse driving conditions. Generally, LOS A indicates free-flow operation with little or no delay, and LOS F denotes jammed flow with substantial delay (Table 3-10). Both the County and the City require roadways to operate at a minimum of LOS C.

Table 3-10. Level of Service Definitions

Level of Service (LOS)	Definition
A	Conditions of free flow; speed is controlled by driver's desires, speed limits, or physical roadway conditions.
B	Conditions of stable flow; operating speeds beginning to be restricted; little or no restriction on maneuverability from other vehicles.
C	Conditions of stable flow; speeds and maneuverability more closely restricted; occasional backups behind left-turning vehicles at intersections.
D	Conditions approach unstable flow; tolerable speeds can be maintained, but temporary restrictions may cause extensive delays; little freedom to maneuver; comfort and convenience low; at intersection, some motorists, especially those making left turns, may wait through one or more signal changes.
E	Conditions approach capacity; unstable flow with stoppages of momentary duration; maneuverability severely limited.
F	Forced flow conditions; stoppages for long periods; low operating speeds.

Source: Transportation Research Board 1994.

3.7.2 Existing Roadway Network

The project area is located west of Almaden Expressway, immediately south of Blossom Hill Road and north of Coleman Road. U.S. Highway 101 (US-101), State Route 85 (SR 85), and State Route 87 (SR 87) provide regional access to the project area. Interstate Routes 880 and 680 (I-880 and I-680) provide regional access to the project area from the East Bay and North Bay areas. Interstate Route 280 (I-280) runs east-west through the City, connecting the San Jose area with the peninsula. Almaden Expressway, Blossom Hill Road, Meridian Avenue, and Coleman Road are the primary roadways that would provide local access (Figure 1, Figure 2). Existing daily traffic volumes and other roadway characteristics are shown below in Table 3-11.

Table 3-11. Roadway Characteristics

Roadway	Responsibility	Classification	Average Daily Traffic	P.M. Peak-Hour Traffic
State Route 85[a]	Caltrans	6-lane freeway	92,000–132,000	6,800–10,700
State Route 87[a]	Caltrans	4-lane freeway	95,000–111,000	7,300–8,500
U.S. Highway 101[a]	Caltrans	8-lane freeway	77,000–168,000	6,300–16,200
Interstate Route 280[a]	Caltrans	8-lane freeway	141,000–227,000	Not Available
Interstate Route 680[a]	Caltrans	8-lane freeway	120,000–157,000	8,800–11,500
Interstate Route 880[a]	Caltrans	4- to 6-lane freeway	138,000–222,000	11,400–18,400
Almaden Expressway[b]	County of Santa Clara	6-lane arterial	64,850[c]	Not Available
Blossom Hill Road[b]	City of San Jose	6-lane arterial	40,200[c]	Not Available
Camden Avenue	City of San Jose	4-lane arterial	Not Available	Not Available
Meridian Avenue[b]	City of San Jose	4-lane arterial	9,720[c]	Not Available
Coleman Road[b]	City of San Jose	4-lane minor arterial	17,970[c]	Not Available

Notes:

[a] California Department of Transportation (1999).

[b] Martin pers. comm.

[c] All data are for most current year available (1995), except data for Meridian Avenue (1996 traffic volumes) and Coleman Road (1998 traffic volumes).

3.7.2.1 State Route 85

SR 85 is located approximately 1 mile north of the project area (Figure 2). The roadway connects with US-101 both north and south of the project area. As shown in Table 3-11, traffic volumes reach 92,000–132,000 vehicles per day (VPD) and the roadway operates at LOS D. The Almaden Expressway interchange provides access to the roadway from the project area.

3.7.2.2 State Route 87

SR 87 is a north-south roadway that extends from SR 85 in South San Jose to US-101 in North San Jose (Figure 2). Traffic volumes reach 95,000–111,000 VPD (Table 3-11) and the roadway operates at LOS D.

3.7.2.3 U.S. Highway 101

US-101 runs north-south through the City and serves as the primary traffic conduit on the San Francisco Peninsula (Figure 2). Traffic volumes reach 77,000–168,000 VPD (Table 3-11), and the roadway operates at LOS D in the vicinity of the project area. US-101 connects with SR 85 both north and south of the project area.

3.7.2.4 Interstate Routes 880, 680, and 280

I-880 and I-680 both run north-south and provide regional access to the City from the East and North Bay areas (Figure 2). I-880 provides regional access from Oakland, and I-680 originates in the North Bay at I-80 and continues through Walnut Creek and Pleasanton. Both I-880 and I-680 are heavily traveled, with traffic volumes ranging from approximately 138,000 to 222,000 VPD for I-880 and from approximately 120,000 to 157,000 VPD for I-680 (Table 3-11). Both roadways operate at LOS D.

I-280 runs east-west through the City, providing a connection for traffic traveling along I-880 and I-680 with the San Francisco Peninsula. Traffic volumes reach 141,000–227,000 vehicles per day (Table 3-11) and the roadway operates at LOS D in the vicinity of the project site.

3.7.2.5 Almaden Expressway

Almaden Expressway is a six-lane arterial roadway located east of the project area. The roadway runs north-south and provides access to SR 85, Blossom Hill Road, and Coleman Road (Figure 1). Traffic volumes are an estimated 64,850 VPD (Table 3-11).

3.7.2.6 Blossom Hill Road

Blossom Hill Road is a six-lane arterial roadway located northwest of the project area. The roadway runs parallel to the project area and connects with Almaden Expressway and Meridian Avenue (Figure 2). Traffic volumes are an estimated 40,200 VPD (Table 3-11).

3.7.2.7 Camden Avenue

Camden Avenue is a four-lane arterial roadway that provides access to the western end of the project area (Figure 1, Figure 2). The roadway runs north-south. Because the City has not conducted traffic counts along this section of roadway near the project site, traffic volumes for this section of roadway are not available (Martin pers comm.).

3.7.2.8 Meridian Avenue

Meridian Avenue is a four-lane arterial roadway that intersects the middle of the project area (Figure 2). The roadway runs north-south and provides access to Blossom Hill and Coleman Roads. Traffic volumes are an estimated 9,720 VPD (Table 3-11).

3.7.2.9 Coleman Road

Coleman Road is a four-lane minor arterial roadway located south of the project area (Figure 2). The roadway runs parallel to the project area and provides direct access to GuadalupeCreek. Coleman Road connects with Meridian Avenue and Almaden Expressway. Traffic volumes are an estimated 17,970 VPD (Table 3-11).

3.7.2.10 Alternative Transportation

The Santa Clara Valley Transportation Authority provides bus service to areas that surround the project area. Bus Routes 13, 63, and 27 are the closest routes to the project area. In addition, Almaden Expressway and Coleman Road provide designated bicycle lanes in both directions.

3.8 AIR QUALITY

3.8.1 Topography and Meteorology

The project area, like the rest of the San Francisco Bay region, enjoys a Mediterranean climate generally characterized by moist mild winters and dry summers. Summer average maximum temperatures range from 79°F to 82°F, and summer average minimum temperatures range from 55°F to 57°F. Winter average maximum temperatures range from 58°F to 62°F, and winter average minimum temperatures range from 41°F to 44°F (Western Regional Climate Center 1999; http://www.wrcc.dri.edu). The measurable precipitation in the project area is rainfall, 85% of which occurs between November and April. Mean annual precipitation ranges from a high of 40 inches near Mt. Umunhum to a low of 16 inches near the confluence of Guadalupe and Alamitos Creeks (Santa Clara Valley Water District 1994).

Topography in and surrounding Santa Clara Valley is a primary influence on the valley's winds, creating a prevailing flow that roughly parallels the valley's northwest-southeast axis. A north-northwesterly sea breeze blows through the valley during the afternoon and early evening, and a light south-southeasterly drainage flow occurs during the late evening and early morning. In summer, the southern end of the valley becomes a "convergent zone" when air flowing from Monterey Bay is channeled northward into the southern end of the valley and meets with the prevailing north-northwesterly winds.

Wind speeds are generally highest in spring and summer and lowest in fall and winter. Mild winds are common in all four seasons and summer afternoons and evenings are often breezy. Strong winds are rare and are associated mostly with an occasional winter storm.

3.8.2 Existing Air Quality Conditions

California's air pollution control districts and CARB routinely measure and report ambient air quality data. CARB summarizes these data in quarterly and annual reports, which provided the basis for the following summaries of air quality in the City. Table 3-12 summarizes relevant federal and state air quality standards.

CO, ozone, and PM10 are the greatest concerns at the project site and throughout the SFBAAB, because of the SFBAAB's nonattainment status for ozone and PM10. The environmental effects of elevated CO, ozone, and PM10 concentrations are well known. CO, a product of incomplete combustion, can interfere with oxygen transport to body tissues. The major effects of ozone (a component of photochemical smog) can include respiratory system irritation, eye irritation, and plant-growth and crop-yield reductions. Particulate matter can be responsible for a wide range of pollution effects, including reduced visibility, respiratory system irritation, corrosion of structures and materials, and economic impacts related to soiling of materials.

3.8.2.1 PM10

State 24-hour standards have been exceeded in the 5 most recent years for which data have been collected at the 4th Street station in the City. During the past 5 years, state PM10 standards have been exceeded 2–7 times each year. No violations of the federal PM10 standards have occurred in the City during the last 5 years.

3.8.2.2 Carbon Monoxide

The monitoring data show no violations of federal or state CO standards during the 5 most recent years for which data are available.

3.8.2.3 Ozone

The ozone standard has been exceeded in 4 of the 5 most recent years for which data have been collected at the 4th Street station in the City. As many as 14 violations per year have occurred during this period.

3.9 NOISE

The noise environment in the City is dominated by noise from traffic on highways and local roadways. In the vicinity of San Jose International Airport, aircraft flyovers are also a significant source of noise. In the project area, sources of noise include traffic and other typical noise sources associated with an urban setting, such as noise from landscape maintenance equipment. Noise-sensitive residential uses are located adjacent to the project area.

3.10 PUBLIC SERVICES AND UTILITIES

The public services and facilities addressed in this section include: fire protection; police protection; parks, recreation, and public access; schools; water supply; wastewater treatment; storm drainage; solid waste disposal; and utilities.

3.10.1 Fire Protection

The City's fire protection services are provided by the San Jose Fire Department (SJFD). The SJFD has 31 stations that house a total of 31 engine companies, eight truck companies, three rescue companies, and one hazardous materials company. Citywide daily staffing comprises a total of 192 response personnel, five battalion chiefs, one division chief, and one arson investigator. In total, SJFD employs 702 firefighters and109 civilian personnel (Scully pers. comm.). The staff of SJFD is supplemented by participation in a mutual aid program with the nearby cities of Milpitas and Santa Clara. Under this program, one or both of the mutual aid cities would provide assistance to the SJFD if needed.

The City has established a level of service standard for fire protection services. The level of service is assessed by measuring the response time, called "total reflex time," for an emergency call. The level of service standard for the SJFD is to respond to 90% of all calls in 7 minutes or less. In fiscal year 1998–1999, SJFD met this standard 89% of the time, with an average response time of 4 minutes 43 seconds (Scully pers. comm.). SJFD's Station 17 is located on Ridgewood Drive less than 1 mile from the project area. Response time from the station to the project area is less than 5 minutes.

3.10.2 Police Protection

The City's police protection and law enforcement services are provided by the San Jose Police Department (SJPD). The SJPD employs 1,342 sworn officers and 447 civilian workers.

Table 3-12. State and Federal Ambient Air Quality Standards Applicable in California

			Standard, as parts per million		Standard, as micrograms per cubic meter			
Pollutant	Symbol	Average Time	California	National	California	National	California	National
Ozone	O_3	8 hours	N/A	0.08	N/A	160	N/A	If 3-year average of annual third-highest daily 8-hour maximum exceeds standard
		1 hour	0.09	0.12	180	235	If exceeded	If exceeded on more than 3 days in 3 years
Carbon monoxide	CO	8 hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
Nitrogen dioxide	NO_2	Annual average	N/A	0.053	N/A	100	N/A	If exceeded
		1 hour	0.25	N/A	470	N/A	If exceeded	N/A
Sulfur dioxide	SO_2	Annual average	N/A	0.03	N/A	80	N/A	If exceeded
		24 hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day per year
Inhalable particulate matter	PM10	Annual geometric mean	N/A	N/A	30	N/A	If exceeded	N/A
		Annual arithmetic mean	N/A	N/A	N/A	50	N/A	If exceeded
		24 hours	N/A	N/A	50	150	N/A	If exceeded on more than 1 day per year
Fine particulate matter	PM2.5	Annual arithmetic mean	N/A	N/A	N/A	15	N/A	If spatial average exceeded on more than 3 days in 3 years
		24 hours	N/A	N/A	N/A	65	N/A	If exceeds 98th percentile of concentrations in a year

Notes: All standards are based on measurements at 25°C and 1 atmosphere pressure.
National standards shown are the primary (health effects) standards.

N/A = not applicable.

The City has established a level of service standard for police protection services. The level of service is assessed by measuring the response time for an emergency call. The recommended level of service for police protection is a response time of 6 minutes or less for 60% of all priority 1 calls, and a response time of 11 minutes or less for 60% of all priority 2 calls. A priority 1 call is a call involving

- present or imminent danger to life
- major damage to or loss of property, or
- a major felony that is in progress or has just occurred.

A priority 2 call is a call involving

- missing children (age 12 and under),
- a subject in custody, or
- a crime that is in progress or has just occurred, with injuries, property damage, or a suspect still present or in the area.

In 1999, the average response time was 3 minutes and 45 seconds for priority 1 calls and 6 minutes and 35 seconds for priority 2 calls (Martinez pers. comm.). Response times for police to the project area are less than 5 minutes.

3.10.3 Public Access, Parks, and Recreation

3.10.3.1 Public Access to Project Site

The majority of land in and directly adjacent to Guadalupe Creek is owned by the District; in addition, the City of San Jose owns a 1.88-acre parcel located on the south side of the creek immediately downstream of the Meridian Avenue Bridge. No recreational activities are allowed along the creek and public access to the project site is restricted to environmental education activities involving local schools. In practice, there is little if any enforcement of these restrictions, and Guadalupe Creek is used for informal recreational activities, though access to the creek is controlled by fencing and gates. Most recreation on the creek occurs on levee maintenance roads and includes walking, running, wildlife viewing, and biking (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). Fishing also takes place in the Creek.

At present, the District has no plans to open the project site to future recreational use. However, the area is included in the County's Countywide Trails Master Plan. If this plan is realized, the project area could be incorporated into the Guadalupe Trail, which is proposed to extend from the Bay Trail in the City to Guadalupe Reservoir. The Guadalupe Trail would be part of the Northern Recreation Retracement Route. This route is a shared-use trail that extends from the San Benito County line, traveling north along the western side of Santa Clara Valley to the San Mateo

County line. Trail uses would include hiking, biking, and equestrian uses (Santa Clara County Trails Plan Advisory Committee 1995).

3.10.3.2 Parks

The City provides parklands, open space, and community facilities for public recreation and community services. Some of these facilities are provided in conjunction with, or are supplemented by, other public facilities, such as schools, County parks, and lands used for flood control purposes. The operation, maintenance, and construction of all City parks and recreational facilities is the responsibility of the City Department of Streets and Parks (City of San Jose 1994).

The City has established a level of service standard for parklands and community centers. The level of service recommended in the General Plan is as follows (City of San Jose 1994):

- 3.5 acres of neighborhood- and community-serving recreational lands per 1,000 population (comprising a minimum of 1.5 acres of neighborhood-, community-, or locally serving regional/citywide parklands and as much as 2 acres of school playgrounds, all of which is located within a reasonable walking distance);
- 7.5 acres of regional/citywide parklands per 1,000 population, and
- 500 square feet of community center floor area per 1,000 population.

According to the City Department of Streets and Parks, these level of service goals have not yet been achieved (City of San Jose 1994).

One regional park and seven neighborhood parks are located within 1 mile of the project area. The regional park, Almaden Lake Park, includes a full range of recreational facilities and services, such as: group and individual picnic areas; boating, fishing, and swimming opportunities; paved trails; and youth and adult activity classes. The neighborhood parks are Los Alamitos Pond, Guadalupe Creek, De Anza, Guadalupe Oak Grove, T. J. Martin, Oak Glen, and Almaden Winery. Facilities and activities at the neighborhood parks are more limited but include parcourses, tot lots, and picnic tables. In addition to the area's City parks, Almaden Quicksilver County Park is located approximately 5 miles upstream from the project area. This County park covers nearly 4,000 acres and provides a full range of recreational activities, emphasizing the 135 years of mining activities in the Capitancillos Ridge area.

3.10.4 Schools

The County supports both public and private schools. The City's San Jose Joint Unified School District is the largest school system in the County, with 29 elementary schools, seven middle schools, and seven high schools.

Five schools are located within approximately 0.25–0.3 mile of the project area. These include: Pioneer High School (public), Dartmouth Middle School (public), and Guadalupe School (public elementary), as well as Beacon School and the Learning Company and Academy (private). Pioneer High School, situated west of Almaden Expressway and north of the Los Capitancillos percolation ponds, is closest to the project area.

3.10.5 Utilities

Basic infrastructure in the project area includes water and wastewater (sewer) lines, storm drains, gas and electrical lines, telephone, and cable television. These facilities are conveyed to the public via underground pipes, conduits under bridges, and overhead wires in and adjacent to roads near the project area.

Facilities that cross or intersect the project area include a 16-inch water line located in the Meridian Avenue Bridge, approximately 14 storm drains, and a sewer siphon under the Meridian Avenue Bridge. Immediately outside the project area, a 72-inch water supply line (the Almaden Valley Pipeline) and an overhead transmission line cross Guadalupe Creek on the south side of Masson Dam.

Following are the agencies and companies responsible for maintaining services in and around the project area:

- wastewater, storm drainage – the City
- water supply – San Jose Water Company
- electricity, natural gas – Pacific Gas & Electric Company
- telephone – Pacific Bell
- cable television – AT&T Cable Service.

3.10.5.1 Water Supply

The City's drinking water is supplied by a variety of sources. The local supply system provides water from runoff that is collected in area reservoirs and later discharged into streams and ponds to augment natural groundwater recharge. There are 12 local reservoirs with a total capacity of 181,548 acre feet. However, local sources are not sufficient to meet the City's water demands even in normal rainfall years. Therefore, the District typically imports approximately one-half of the

County's water supply. Imported water is obtained from three sources: from the state water project via the South Bay Aqueduct, from the San Francisco Water Department's Hetch Hetchy Aqueduct, and from the San Felipe Division of the federal Central Valley Project.

The City also acquires water from deep aquifers through groundwater wells. The Santa Clara Valley is underlain by three groundwater basins. The Santa Clara Valley subbasin has a maximum operating storage capacity of 250,000 acre-feet and extends from Palo Alto to Milpitas to the Coyote Valley. Water from the Santa Clara Valley subbasin flows north to San Francisco Bay (City of San Jose 1994).

3.10.5.2 Wastewater Treatment

The City's wastewater is treated at the San Jose/Santa Clara Water Pollution Control Plant (WPCP), located in the City's Alviso planning area at the southern tip of San Francisco Bay. The WPCP has a design capacity of 167 million gallons per day (mgd) and processes an estimated 100–205 mgd of effluent (dry weather peak).

3.10.5.3 Flood Protection and Storm Drainage

The District is responsible for flood protection on all creeks and waterways within the County that drain more than 320 acres. The District is also responsible for coordinating flood hazard mitigation efforts for the major creeks and waterways in the City and for reviewing development proposals that could affect flood control activities along these channels. Guadalupe Creek is not recognized by the City as a waterway prone to flooding.

Santa Clara Valley's creeks, rivers, and other waterways route storm runoff from the Diablo Range and the Santa Cruz Mountains to San Francisco Bay. Runoff tends to be more intense in areas with impervious surfaces than in areas with vegetated surfaces that allow for percolation into the soil. Within the urbanized areas of the City, storm runoff flows into local storm drains, which discharge into the creeks. The creeks in turn transport runoff north into the Bay.

In general, the existing storm drainage system is adequate to convey flows through the part of the City in the project vicinity. However, minor flooding can occur when catch basins or storm lines become clogged with debris, when high water levels in the creeks prevent discharge, or when runoff exceeds the capacity of the storm drainage system.

3.10.5.4 Solid Waste Disposal

Several companies provide waste collection services in the City. The existing disposal facilities in the County include: the Guadalupe Rubbish Disposal Site; Kirby Canyon Sanitary Landfill; Newby Island Sanitary Landfill; facilities in Pacheco Pass, Palo Alto, Santa Clara, and Sunnyvale; and the Zanker Road Disposal and Recycling Center. The City currently generates approximately 1,454,800 tons of solid waste annually. At the current rate of landfill activity, 1.8 million tons per year, and an annual increase in solid waste of 1.1%, approximately 24 years of capacity remain in the landfills. At this time, there are no plans to establish new disposal facilities within the City.

3.11 AGRICULTURAL RESOURCES

Historically, the lands surrounding the project area were used for agricultural purposes and had rural residential housing densities. As the City has grown, residential and suburban land uses have intensified. The project vicinity currently supports no agricultural land uses, and no lands in this area are designated as agricultural by the General Plan (City of San Jose 1994).

3.12 AESTHETICS

The Guadalupe Creek corridor, which is visible from Coleman Road and nearby residential developments, is an open-space area characterized by individual trees and shrubs, small clusters of riparian vegetation, and annual grasslands. Riparian vegetation is confined to the area immediately adjacent to the creek; annual grasslands are primarily found between the riparian corridor and the levees. The creek corridor supports some wildlife and may offer limited wildlife viewing from adjacent areas, although it is surrounded by a chain-link fence restricting public access to the area. Percolation ponds within the project area provide additional visual relief to the region (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000).

3.13 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Because the District may receive federal reimbursement for costs associated with project construction, the proposed project must comply with NEPA as well as CEQA. Therefore, this EIR/EIS includes the following discussion of existing conditions with regard to socioeconomics and environmental justice. Specific topics include current population, housing, and employment levels. This section also provides background information on the ethnic and income characteristics of people living in the project area. Information for the project's socioeconomic analysis was obtained from the California Department of Finance, the U.S. Bureau of Economic Analysis, and the U.S. Census Bureau.

3.13.1 Population and Housing

Population and housing characteristics for the City are presented in Table 3-13 (following page). Of the various municipalities in the County, the City is the largest, accounting for 53% of the County's total population.

Table 3-13. Population and Housing in the City and County (1998)

	Total Population	Total Homes	Percent Vacant	Persons Per Household
Santa Clara County	1,715,374	581,532	3.85%	3
City of San Jose	909,062	282,861	3.53%	3.3

Sources: California Department of Finance 2000.

Overall, the City and County are expected to lead the region in numerical population and employment growth over the next 20 years. Population growth in Santa Clara, Alameda, and Contra Costa Counties will account for more than 61% of the region's overall growth during the 1995–2020 period (Associated Bay Area Council of Governments 1998).

In addition to population data, Table 3-13 also provides information on housing in the City and County. Only 3.85% (9,900) of the housing units within City limits were vacant as of January 1, 1999. Within the San Jose area, the median value of a single-family detached home was $400,000 in 1999 (Realtytimes 2000).

3.13.2 Employment

The labor market in the City and County is dominated by the services industry, and in particular by business services. Business services firms provide a variety of services to other businesses, such as advertising, building maintenance, and, of particular importance in the County, data processing services. Data processing services, which include computer programming and the development and production of prepackaged computer software, will continue to record some of the fastest employment growth in the County (California Employment Development Department 2000). The City and surrounding area are commonly referred to as "Silicon Valley" because of their importance to the high-tech industry nationwide.

Currently, an estimated 934,700 part- and full-time jobs are held in the County (Table 3-14, following page). The average unemployment rate for the County is 2.4%. This is lower than the statewide unemployment rate of 4.7% (California Employment Development Department 2000).

Table 3-14. Employment Characteristics for Santa Clara County

Industry	Percent of Total Employment[a]
Agriculture	1
Mining	<1
Construction	4
Manufacturing	23
Transportation, Communications, and Utilities	3
Wholesale Trade	5
Retail Trade	14
Finance, Insurance, and Real Estate	6
Services	36
Government	8
Total:	100

Source: California Employment Development Department 2000.

[a] 934,700 part- and full-time employees.

3.13.3 Environmental Justice

The following sections describe the existing ethnic and income composition of the area defined by zip code 95118, which contains the project area.

3.13.3.1 Ethnicity

Based on information from the 1990 census, the proportions of various ethnic groups in the area defined by zip code 95118 range from 75% (white) to <1% American Indian, with minority populations accounting for an estimated 24% of the area's total population (Table 3-15).

Table 3-15. Income and Ethnicity Data for the City of San Jose and Project Area (Zip Code 95118)

Area	Median Household Income	White	African American	American Indian	Asian/Pacific Islander	Hispanic
City of San Jose	$48,115	50%	4%	less than 1%	19%	26%
Project Area (Zip Code 95118)	$47,015	75%	2%	less than 1%	8%	14%

Source: U.S. Bureau of the Census 1992.

Chapter 4. Environmental Impacts and Mitigation Measures

4.1 LAND USE AND PLANNING

4.1.1 Methodology and Significance Criteria

The following evaluation of impacts on land use and planning is based on information gathered from site visits and a review of pertinent literature including local plans and relevant EIRs.

Criteria for determining the significance of land use and planning impacts were based on Appendix G of the CEQA Guidelines, the NEPA Regulations, and professional judgment. The project may have a significant impact on the environment if it would:

- physically divide an established community;
- conflict with any applicable federal, state, local, or tribal land use plan or relevant policies, including the General Plan; or
- conflict with any applicable habitat conservation plan or natural community plan.

4.1.2 Proposed Project—Channel and Floodplain Modification

4.1.2.1 Impact Analysis

The proposed project would not add or modify any structures or alter the environment in any way that would cause an established community to be divided. The site is not under the jurisdiction of a habitat conservation plan or community conservation plan. The District will incorporate a parcel of land owned by the City into the project area. This parcel is currently zoned as open space. Inclusion of this parcel in the project area will not require a change in the current zoning; the project is thus consistent with applicable land use policies.

During construction, minor disturbances to adjacent residential land uses could result from increased noise, dust, and other nuisances related to construction activities. This impact is considered less than significant because construction will be temporary and short-term (limited to

April–October) and construction activities will take place on weekdays between 7:00 a.m. and 5:00 p.m. (not on weekends and holidays). The impact will be further minimized by the implementation of project BMPs. Once construction is complete, the proposed project will not be incompatible with existing or planned land uses within or adjacent to the project area. Therefore, the proposed project will not have a significant impact on land use and planning.

4.1.2.2 Mitigation

No mitigation is required, because of the short-term duration of planned construction and the BMPs included in the project description (see *Soil Management Plan*, *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities*, and *Measures to Address Noise-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.1.3 Alternative 1—Reduced Channel and Floodplain Modification

4.1.3.1 Impact Analysis

Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Because of this limitation, less excavation and planting would take place under Alternative 1 than under the proposed project, and construction-related impacts would be correspondingly reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Alternative 1 would not conflict with any applicable land-use plans or policies or divide any established communities. Potential impacts on land use and planning under Alternative 1 would be similar to but slightly less than those described for the proposed project and are not considered significant.

4.1.3.2 Mitigation

No mitigation is required.

4.1.4 Alternative 2—Minimal Channel and Floodplain Modification

4.1.4.1 Impact Analysis

Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Substantially less excavation and planting would take place under Alternative 2 than under the proposed project or Alternative 1. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). The potential impacts on land use under Alternative 2 would be similar to but less than those described for the proposed project and Alternative 1.

4.1.4.2 Mitigation

No mitigation is required.

4.1.5 Alternative 3—No Project

4.1.5.1 Impact Analysis

Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project area.

4.1.5.2 Mitigation

No mitigation is required.

4.2 BIOLOGICAL RESOURCES

4.2.1 Methodology and Significance Criteria

4.2.1.1 Wildlife Methodology

This evaluation of impacts on wildlife resources was based on information drawn from a variety of sources and on a review of the proposed project. Current field guides, biological field survey reports, annotated lists of local birds, and information collected during site visits on October 15, 1999, and March 9, 2000, were used to determine which fish and wildlife species are found in the project area. Relevant scientific literature and reports on related local projects were also reviewed for information on the impacts of various land treatments on individual species. Before the field visits, an NDDB search was conducted for the U.S. Geological Survey's Los Gatos and Santa Teresa Hills 7.5' topographic quadrangles to develop a list of special-status plant and wildlife species and sensitive natural communities with the potential to occur in the project area (Appendix A). During the field visits, a Jones & Stokes biologist traversed the project site on foot, described general site conditions, documented the habitat types present, and recorded all plant and wildlife species observed.

4.2.1.2 Vegetation Methodology

This evaluation of impacts on vegetation resources was based on the following sources: a review of pertinent literature; contacts with knowledgeable individuals; DFG's NDDB; information collected during site visits on October 15, 1999, and March 9, 2000; and a review of the project description. Before the field visits, an NDDB search was conducted for the U.S. Geological Survey's Los Gatos and Santa Teresa Hills 7.5' topographic quadrangles to develop a list of special-status plant and wildlife species and sensitive natural communities with the potential to occur in the project area (Appendix A). During the field visits, a Jones & Stokes biologist traversed the project site on foot, described general site conditions, documented the habitat types present, and recorded all plant and wildlife species observed.

A wetland delineation for the site was conducted by a Jones & Stokes wetland ecologist on October 15, 1999, following the routine wetland delineation procedures described in the Corps' wetland delineation manual (Environmental Laboratory 1987). Additional fieldwork was completed in March 2000. The results of the delineation are presented in a report titled "Preliminary delineation of waters of the United States for the Guadalupe Creek Restoration Site, San Jose, CA" (Jones & Stokes 2000b; this delineation has not been verified by the Corps). Appendix C provides a list of plant and wildlife species encountered during the field visits. Information on special-status species and sensitive natural communities is given in Appendix A.

4.2.1.3 Significance Criteria

Criteria for determining the significance of biological impacts were based on Appendix G of the State CEQA Guidelines and on professional judgment. The project may have a significant effect on the environment if it would:

- cause substantial loss or deterioration of wildlife habitat, disruption of natural movement corridors for wildlife, or fragmentation or isolation of riparian habitats;
- cause substantial loss of anadromous fish habitat (for all life stages);
- interfere substantially with passage of resident or migratory fish (adult or juvenile);
- cause substantial disturbance or displacement of fish and wildlife species as a result of human activities;
- result in direct mortality to, or lowered reproductive success of, fish or wildlife species identified as candidate, sensitive or special-status species in local or regional plans, policies, or regulations, or by DFG or USFWS; or

- reduce the numbers of fish or wildlife species identified as candidate, sensitive or special-status species in local or regional plans, policies, or regulations, or by DFG or USFWS.
- substantially affect a special-status plant or animal species or the species' habitat;
- interfere substantially with the movement of any resident or migratory wildlife species;
- substantially affect, reduce the number of, or restrict the range of an endangered species or the species' habitat;
- substantially diminish the acreage or value of local habitat for wildlife or plants;
- adversely affect biologically unique or sensitive natural communities such as riparian lands and wetlands, or other wildlife habitats;
- result in the filling of jurisdictional wetlands;
- result in impacts on sensitive natural communities;
- cause long-term degradation of common plant communities or wildlife habitat because of substantial alteration of landform or site conditions;
- substantially reduce local population size because of direct mortality or habitat loss, lowered reproductive success, or habitat fragmentation; or
- substantially disturb wildlife as a result of human activities.

4.2.1.4 Types of Impacts on Vegetation

The proposed project is expected to result in two kinds of impacts on botanical resources: temporary (short-term) impacts associated with construction activities and permanent impacts resulting from surface or landform alterations. Jones & Stokes evaluated potential impacts on special-status plants and sensitive natural communities, including wetlands and other waters of the United States. Botanical resources adversely affected by the project will be replaced onsite as part of the project, in most cases in the same location as the impact.

4.2.1.4.1 Special-Status Plants. The background analysis for the project and the onsite field visits determined that the site does not encompass suitable habitat for any of the special-status plant species listed in Appendix A. Therefore, the propose project will have no impact on special-status plant populations.

4.2.1.4.2 Sensitive Natural Communities; Wetlands and Other Waters of the United States. The project area includes four types of sensitive natural communities, as defined by DFG:

- riverine wetland,
- willow riparian scrub,
- sycamore alluvial woodland, and
- coast live oak woodland ("oak woodland").

All the riverine wetland in the project area meets the criteria for jurisdictional wetlands given in Section 404 of the CWA. The project area also includes habitat (e.g., open water, vegetated and unvegetated gravel bars) that qualifies as "other waters of the United States". The proposed project is not expected to affect oak woodland but will have minor impacts on the other three sensitive habitats. These impacts are addressed in the following sections.

4.2.2 Proposed Project—Channel and Floodplain Modification

4.2.2.1 Impact: Loss of Low-Quality Riparian Scrub and Forest Habitat

4.2.2.1.1 Analysis. Construction activities associated with the proposed project (i.e., excavation and grading to create surfaces suitable for planting SRA cover vegetation) will result in the removal of approximately 1.1 acres of existing riparian scrub and forest habitat. The majority of this vegetation (1 acre) consists of non-native Himalayan blackberry, which provides only limited value for native wildlife species. The existing habitat is used by small birds such as the house finch for foraging, nesting, and cover. Because the existing vegetation provides only limited value for native wildlife species, the impact associated with removing this low-quality riparian scrub and forest habitat is considered less than significant. Moreover, the proposed project specifically entails replacing the vegetation removed with native riparian scrub and forest vegetation that will provide high-quality cover, foraging, and nesting habitat for native wildlife species, and overhead cover and shade for fish.

4.2.2.1.2 Mitigation. No mitigation is required.

4.2.2.2 Impact: Disruption of Wildlife during Breeding Periods

4.2.2.2.1 Analysis. The proposed project site is located in and adjacent to riparian habitats that may support nesting neotropical birds protected under the MBTA. If the construction period extends into the February 15–July 31 migratory bird breeding period, preventive measures (incorporated into the project description as BMPs) to comply with the MBTA will be implemented to avoid significant impacts on birds in the project area. This impact is therefore considered less than significant.

4.2.2.2.2. Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Comply with Migratory Bird Treaty Act* in the *Best Management Practices* section of Chapter 2).

4.2.2.3 Impact: Harm to Anadromous Fish in All Life Stages Resulting from Construction Activities

4.2.2.3.1 Analysis. Construction activities associated with the proposed project may adversely affect all life stages of anadromous fish (steelhead and chinook salmon). Because earthmoving activities associated with excavation and recountouring of floodplain surfaces may loosen soils and sediments in the creek and along its banks, earthmoving could result in the release of short-term pulses of sediment into the creek during the first series of storm events after project construction. During the rainy season, a large storm may increase flow in the creek, dislodging loose soil/sediment and carrying it downstream. Increased overland runoff over loosened soil/sediment during storm events may also increase sediment input to the creek. These sediment pulses could affect gravel substrate associated with redds and other important aquatic habitat features. In addition, dewatering to facilitate construction of instream features has the potential to strand fish, impede fish movement, and adversely affect native aquatic invertebrates.

The proposed project incorporates preventive measures that will be implemented during construction to control erosion and minimize the potential for sediment input to the creek, in order to avoid potential impacts on aquatic habitats and anadromous fish. Implementation of these measures will reduce impacts on anadromous fish to a less-than-significant level.

Moreover, although Guadalupe Creek has been designated as critical habitat for steelhead by NMFS, existing fish habitat resources are very limited in the project reach of the creek (see discussion in *Biological Resources* section of Chapter 3). Implementation of the proposed project will provide benefits for anadromous fish by substantially increasing overhead cover vegetation and reducing stream temperatures, and by providing a greater water depth for fish passage by narrowing the wetted width of the stream under low-flow conditions. The proposed project will further benefit anadromous species by increasing habitat complexity in several locations. Thus, implementation of the project will have no adverse effect on critical habitat for steelhead.

4.2.2.3.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Construction Period Limits* and *Construction-Area Fish Management Measures* in the *Best Management Practices* section of Chapter 2).

4.2.2.4 Impact: Loss of Wildlife Habitat Because of Tree Removal

4.2.2.4.1 Analysis. The proposed project was designed to avoid impacts on existing mature trees to the extent possible. However, as many as seven mature trees (0.30 acre, based on area of canopy cover) may be removed as a result of, or adversely affected by, the following construction activities:

- excavating and grading existing floodplain surfaces to create surfaces suitable for planting SRA cover vegetation,
- shifting or realigning the channel planform to increase aquatic habitat complexity, and
- facilitating the return of high floodflows into the main channel.

The locations of the mature trees likely to be affected by project construction are believed to reflect past hydrologic patterns; the trees are probably no longer within the active riparian zone. However, the trees do provide potential nesting and roosting habitat for local wildlife and removing them will result in the loss of wildlife habitat. Incorporation of the following mitigation measure will reduce this impact to a less-than-significant level.

4.2.2.4.2 Mitigation. To compensate for the loss of nesting habitat, the District will be responsible for installing nesting and roosting boxes for birds and bats onsite at a ratio based on the size of the removed tree (i.e., one box per 12 inches dbh) before the first breeding season after construction begins. A qualified wildlife biologist will determine the design and locations of the boxes. Furthermore, the biologist and appropriate District staff members will conduct a site visit within 1 week after the boxes are installed to confirm that the boxes have been properly installed and located. If the biologist determines that any of the boxes are improperly located or constructed, the District will immediately arrange for reinstallation of the boxes. A qualified wildlife biologist will also monitor the boxes on a monthly basis from April to June and evict any non-native species.

4.2.2.5 Impact: Potential Adverse Effects on Fish and Wildlife from Increased Exposure to Mercury

4.2.2.5.1 Analysis. The primary objective of the proposed project is to restore SRA cover vegetation and improve aquatic habitat for anadromous fish (e.g., steelhead) in the project area. However, as discussed in Chapter 3, analysis of water, sediment, and vegetation samples taken in the project area indicates that under existing conditions methyl mercury is present in the water column and in instream sediments, and that it is being taken up by aquatic plants. Because restoring riparian vegetation and improving aquatic habitat may attract more fish and wildlife to the project area, it is necessary to consider whether implementation of the proposed project will result in adverse effects on these species from increased exposure to mercury.

Mercury levels and uptake rates in exposed plants and wildlife depend on the source and type of mercury to which the organisms are exposed and on the structure of the local food web (i.e., the uptake pathway). Both terrestrial and aquatic plants take up inorganic and methyl mercury from water, sediment, and the atmosphere. Uptake rate varies by species, but mercury uptake is typically higher in aquatic plants than in terrestrial plants because methyl mercury in particular is more readily taken up from water than from sediment. Aquatic organisms at lower trophic levels (e.g., algae, phytoplankton, filter feeding invertebrates) take up mercury predominantly from dissolved concentrations in the water column. Species at higher trophic levels (such as fish) accumulate mercury from two sources: via bioaccumulation[1] from the tissues of organisms they consume and via direct adsorbtion from the water column (Hill et al. 1996). Mercury concentrations in fish vary by species because of differences in diet, metabolic rates, and growth rates. In general, larger, older fish have higher mercury concentrations, partly because their prey consists of larger species from higher trophic levels. Piscivorous (fish-eating) fishes also tend to have higher mercury concentrations than species that feed primarily on algae or invertebrates. Mercury concentrations in other species at higher trophic levels, including birds and other wildlife, are also directly correlated with diet. Because mercury is concentrated in the muscle tissue of exposed fish, birds such as the black-crowned night heron, common merganser, and belted kingfisher that prey on fish tend to bioaccumulate more mercury than species that feed on a greater variety of foods (e.g., invertebrates, amphibians, small mammals). However, there is some variability based on species-specific sensitivity, foraging area, size of fish consumed, percentage of fish in the diet, and other factors.

The proposed project incorporates a number of specific design features for restoring SRA cover and riparian vegetation and improving anadromous fish habitat in the project area. As a result, implementation of the proposed project will substantially change existing physical and biological conditions and may change the potential for uptake and bioaccumulation of methyl mercury in the project area. For example:

- Increasing the riparian canopy and the percentage of shaded stream surface will reduce water temperatures and increase the amount of instream leaf litter[2], resulting in a general shift in the macroinvertebrate community from filter feeders to species that feed on coarse organic material. The increased riparian canopy will also decrease algal growth on the rocky substrate, resulting in a subsequent decrease in the abundance of macroinvertebrates that feed on algae. This shift in the macroinvertebrate community from filter feeders and species that feed on algae to species that feed on coarse organic material may reduce the uptake and bioaccumulation of methyl mercury at lower trophic levels within the project reach.

- Increasing the extent of riparian canopy and the percentage of shaded stream surface will gradually shift the fish population in favor of native coldwater species over non-native warmwater species as water temperatures and instream habitat characteristics change. Populations of species such as steelhead/rainbow trout and sculpin that prefer cooler waters will gradually increase as riparian habitat becomes established and water temperatures are reduced. Some coldwater species, such as steelhead, spend only part of their life cycle in fresh water; this reduced residency time (e.g., 2 years for steelhead) decreases the overall exposure of these species to methyl mercury and may reduce uptake and bioaccumulation in anadromous coldwater species compared to resident warmwater species. Colder instream water temperatures will also lower metabolic rates in fish, lowering food consumption and potentially reducing bioaccumulation rates.

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[1] *Bioaccumulation* refers to the process by which a contaminant (such as mercury) accumulates and concentrates as it is passed upward through the food web.

[2] The increase in instream leaf litter is not expected to increase bioavailable mercury because terrestrial plants tend to concentrate mercury in stems and roots, rather than in leaves (Tetra Tech pers. comm.).

- Increasing the riparian canopy and the percentage of shaded stream surface and decreasing the amount of riverine wetland vegetation during the life of the project will also result in changes in the populations of birds that forage in the project area. Increased riparian woodland area will increase populations of neotropical migrants (e.g., black-headed grosbeaks and yellow-breasted chats), ash-throated and willow flycatchers, and other insect- or seed-eating species. The number of birds such as herons and egrets that feed on fish and/or aquatic macroinvertebrates are not expected to increase, and may decrease as the riparian canopy becomes established and the amount of riverine wetland habitat is gradually reduced. The shift in bird populations in favor of insect- and seed-dependent species may also reduce mercury bioaccumulation at higher trophic levels.

In general, the changes in physical conditions that will result from implementation of the proposed project (described above) are expected to cause a shift in the types of organisms that use the project area but will not substantially increase the total biomass of organisms found in the project area. In addition, as described in the *Hydrology and Water Quality* section of this chapter, features included in the proposed project are designed to create physical conditions that will not increase, and may decrease, the potential for formation of methyl mercury in the project area. Thus, the proposed project is unlikely to result in adverse affects on fish and wildlife from increased exposure to mercury. This impact is considered less than significant.

Maturation of the riparian canopy could take as much as 40 years; many of the physical and biological changes associated with the project will occur over an extended period of time. Thus, it is difficult to predict how the physical and biological changes described above may affect methylation and bioaccumulation rates in a dynamic stream system. Because of the difficulty of predicting changes associated with implementation of the proposed project, the District will implement a monitoring program (as described in the *Hydrology and Water Quality* section of this chapter for *Impact: Increased Formation of Methyl Mercury in the Project Reach of Guadalupe Creek*) to identify and evaluate changes in conditions that could favor methylation in the project area.

4.2.2.5.2 Mitigation. No mitigation is required. The District will implement the monitoring program described for *Impact: Increased Formation of Methyl Mercury in the Project Reach of Guadalupe Creek* to evaluate methyl mercury concentrations and the extent of conditions conducive to mercury methylation in the project area.

4.2.2.6 Impact: Temporary Loss of Riverine Wetland Habitat

4.2.2.6.1 Analysis. The proposed project will result in the temporary loss of as much as approximately 0.94 acre of jurisdictional riverine wetland that is scattered in small patches along the edge of the low-flow channel, on benches, and on the edges of gravel bars. Because of past land-use modifications, the site currently supports an atypical riparian community consisting of isolated remnant stands of sycamore alluvial woodland. In most of the project area, these stands provide only limited cover over the stream surface, allowing the establishment of a higher percentage of riverine wetland vegetation than would be found in a more natural riparian community.

It is unknown how much riverine wetland will naturally reestablish itself after project construction. However, because of the ecology of riverine wetland species, it is expected in the short term that at least as much of this habitat will reestablish itself as is lost because of construction. Riverine wetland species are adapted to the dynamic conditions of a stream system and will rapidly recolonize the project area after disturbance as long as suitable substrate is present. The same species are found in undisturbed parts of the project area and upstream of the project area and will likely be able to supply propagules (seeds or vegetative parts) to recolonize areas disturbed by construction activities. Recolonization of the project site by wetland species would be facilitated by the creation of more suitable substrate than is currently found in the project area. For example, the project will widen and lengthen the channel of Guadalupe Creek, creating more and larger gravel bars and encouraging the deposition of fine sediments, which in turn will facilitate the reestablishment of wetland and riparian vegetation.

Over the long term, because the objectives of the proposed project include creating a denser riparian canopy and a higher percentage of shaded stream surface, it is uncertain whether the project will adversely affect riverine wetland habitat. Once the riparian plantings become established and begin to shade a substantial amount of the stream surface, the establishment and growth of riverine wetland vegetation may be inhibited, resulting in the development of a more natural species composition (i.e., less riverine wetland vegetation and a greater percentage of riparian scrub vegetation) than the project area presently supports. However, patches of riverine wetland vegetation are expected to become established and to persist in gaps in the riparian canopy.

The project will create approximately 6.4 acres of high-quality riparian habitat, a less common and more biologically diverse natural community than riverine wetlands. The proximity of the newly established riparian vegetation to riverine wetlands will increase the overall habitat functions and values of the creek, including enhancing wildlife foraging and cover habitat, reducing erosion and water turbidity, and increasing pollutant filtering. Furthermore, the establishment of riparian vegetation adjacent to the creek channel will substantially increase habitat values for anadromous fish by shading stream surfaces and reducing water temperatures, and increasing the amount of organic material input to the aquatic environment.

Because the project will create conditions suitable for the reestablishment of riverine wetlands and will establish high-quality riparian scrub and forest habitat, impacts on riverine wetlands are considered less than significant.

4.2.2.6.2 Mitigation. No mitigation is required.

4.2.2.7 Impact: Temporary Effects on Waters of the United States

4.2.2.7.1 Analysis. The project will temporarily affect as much as 0.6 acre of waters of the United States, not including wetlands, and approximately 5,000 lf of channel bank as a result of proposed modifications to channel planform and channel banks and the construction of instream habitat structures. These modifications will lengthen the channel, increase instream cover and channel complexity, promote deposition of suitable gravel for spawning, and substantially improve aquatic habitat for anadromous fish. Undesirable vegetation associated with gravel bars located immediately adjacent to the low-flow channel will be removed and replaced with suitable native riparian species. Native riparian vegetation associated with bar surfaces affected by construction activities will be removed and transplanted to suitable locations in the project area. Unvegetated gravel bars affected by the proposed modifications are expected to reestablish after construction. Therefore, impacts on waters of the United States are considered less than significant.

4.2.2.7.2 Mitigation. No mitigation is required.

4.2.2.8 Impact: Loss of Sycamore Alluvial Woodland

4.2.2.8.1 Analysis. The proposed project was designed to avoid impacts on existing vegetation to the extent possible. However, as discussed in *Impact: Loss of Wildlife Habitat Because of Tree Removal* above, as many as seven mature trees (0.30 acre, based on canopy cover) associated with sycamore alluvial woodland habitat may be removed or adversely affected by the following construction activities:

- excavating and grading existing floodplain surfaces to create surfaces suitable for planting SRA cover vegetation;
- shifting or realigning channel planform to increase aquatic habitat complexity; and
- grading floodplain surfaces to facilitate the return of high flows into the main channel.

The locations of these mature trees probably reflect past hydrologic patterns and the trees are likely outside the active riparian zone.

The proposed project includes preventive measures that will be implemented during construction to protect existing vegetation and minimize potential impacts on mature trees (see *Vegetation Protection Measures* in the *Best Management Practices* section of Chapter 2). However, the loss of some trees may be unavoidable. Incorporation of the following mitigation measure will reduce impacts on sycamore alluvial woodland habitat to a less-than-significant level.

4.2.2.8.2 Mitigation. Mature trees removed as a result of the proposed project will be replaced onsite and will be mitigated with compensation planting at a ratio of 3:1 based on area of existing canopy cover. For example, the loss of 1 square foot of canopy cover will be replaced by planting an area equal to 3 square feet. Replacement of mature trees will occur at the same time as project construction. Mitigation plantings will consist of in-kind species (oak, elderberry, and sycamore) from locally native genetic stock. In addition, removed trees will be left on the project site, where they will provide instream aquatic habitat for anadromous fish or upland cover for wildlife, depending on placement.

4.2.2.9 Impact: Loss of Phase 1 Plantings as a Result of Construction

4.2.2.9.1 Analysis. The proposed project was designed to avoid impacts on existing vegetation to the extent possible. However, approximately 0.3 acre of plantings in Reach 4 that were installed under Phase 1 of the Guadalupe Creek Restoration Project may be harmed, removed, or destroyed by implementation of the proposed project. Because the Phase 1 plantings represent mitigation (for impacts of the Downtown Project), any loss must be replaced. Implementation of the following mitigation measure will reduce this impact to a less-than-significant level.

4.2.2.9.2 Mitigation. Phase 1 plantings located in construction areas will be removed before construction activities begin and will be replanted in the Phase 1 mitigation area during the planting phase of the proposed project. Any Phase 1 plantings adversely affected during transplanting activities as a result of the proposed project will be replaced onsite at a 1:1 ratio. Replacement plantings will consist of in-kind species from locally native genetic stock. Preventive measures to protect vegetation during construction (see *Vegetation Protection Measures* in the *Best Management Practices* section of Chapter 2) will be implemented to safeguard remaining Phase 1 plantings.

4.2.2.10 Enhancement Opportunities

Although CEQA does not require them to do so, the District's Board of Directors considers opportunities for enhancing creek and bay ecosystems, consistent with their Ends Policy E-1. For the proposed project, an enhancement opportunity has been identified to improve biological resources on Guadalupe Creek.

4.2.2.10.1 Additional Shaded Riverine Aquatic Cover Habitat. As stated in Chapter 1, the purpose of the proposed project is to restore native anadromous fish habitat that has been lost or degraded as a result of urbanization and previous stream modifications. In addition to benefiting native anadromous fish, approximately 5,915 lf of the SRA cover vegetation planted along Guadalupe Creek under the proposed project may serve as offsite mitigation for impacts of the Downtown Project, if the Downtown Project is implemented (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). However, the proposed project is independent of the Downtown Project and will be implemented even if the Downtown Project is not realized. Vegetation established by the proposed project will likely exceed the Downtown Project's mitigation requirements. The additional vegetation may be used as mitigation credit for future District projects, or the District could choose to treat the additional vegetation as "enhancement opportunities" by foregoing its use as mitigation credits for future projects. If any of the additional SRA vegetation planted under the proposed project is used for mitigation credit, the District will cooperate with resource and regulatory agencies to develop and implement a mitigation credit system.

4.2.3 Alternative 1—Reduced Channel and Floodplain Modification

4.2.3.1 Impact: Loss of Low-Quality Riparian Scrub and Forest Habitat

4.2.3.1.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Because of the reduced construction and planting scope, impacts on existing riparian scrub and forest habitat under Alternative 1 would be slightly less than those described for the proposed project. This impact is considered less than significant.

4.2.3.1.2 Mitigation. No mitigation is required.

4.2.3.2 Impact: Disruption of Wildlife during Breeding Periods

4.2.3.2.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Because of the reduced duration of construction, and the BMPs incorporated in the project description, impacts on wildlife species during breeding periods under Alternative 1 would probably be slightly less than those described for the proposed project. This impact is considered less than significant.

4.2.3.2.2 Mitigation. Mo mitigation is required with implementation of the BMPs included in the project description (see *Measures to Comply with Migratory Bird Treaty Act* in the *Best Management Practices* section of Chapter 2).

4.2.3.3 Impact: Harm to Anadromous Fish in All Life Stages Resulting from Construction Activities

4.2.3.3.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Because of the reduced scope and duration of construction, and the BMPs incorporated in the project description, impacts on anadromous fish in all life stages resulting from construction under Alternative 1 would be slightly less than described for the proposed project. This impact is considered less than significant.

4.2.3.3.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Construction Period Limits* and *Construction-Area Fish Management Measures* in the *Best Management Practices* section of Chapter 2).

4.2.3.4 Impact: Loss of Wildlife Habitat Because of Tree Removal

4.2.3.4.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Impacts on wildlife habitat because of tree removal associated with Alternative 1 would be the same as those described for the proposed project. Mitigation described under the proposed project would reduce this impact to a less-than-significant level.

4.2.3.4.2 Mitigation. Mitigation would be the same as that described under the proposed project.

4.2.3.5 Impact: Potential Adverse Effects on Fish and Wildlife from Increased Exposure to Mercury

4.2.3.5.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Under Alternative 1, the extent of the riparian canopy and the percentage of shaded stream surface would be less than that expected to develop under the proposed project, potentially resulting in the establishment of a greater area of riverine wetland vegetation and in higher methylation rates. Impacts on fish and wildlife species associated with increased exposure to mercury under Alternative 1 would thus be slightly greater than those described for the proposed project. Postproject conditions under Alternative 1 would likely be similar to, or slightly improved as compared to, existing conditions. This impact is considered less than significant.

4.2.3.5.2 Mitigation. No mitigation is required.

4.2.3.6 Impact: Temporary Loss of Riverine Wetland Habitat

4.2.3.6.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Because of the reduced construction and planting scope, impacts on existing riverine wetland under Alternative 1 would be slightly less than those described for the proposed project. This impact is considered less than significant.

4.2.3.6.2 Mitigation. No mitigation is required.

4.2.3.7 Impact: Temporary Effects on Waters of the United States

4.2.3.7.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Because Alternative 1 involves fewer channel planform modifications than the proposed project, temporary effects on Waters of the United States under Alternative 1 would be slightly less than those described for the proposed project. This impact is considered less than significant.

4.2.3.7.2 Mitigation. No mitigation is required.

4.2.3.8 Impact: Loss of Sycamore Alluvial Woodland

4.2.3.8.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Impacts on sycamore alluvial woodland associated with Alternative 1 would be the same as those described for the proposed project. Implementation of the mitigation measure described under the proposed project would reduce this impact to a less-than-significant level.

4.2.3.8.2 Mitigation. Mitigation would be the same as that described under the proposed project.

4.2.3.9 Impact: Loss of Phase 1 Plantings as a Result of Construction

4.2.3.9.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Impacts on Phase 1 riparian plantings associated with Alternative 1 would be the same as those described for the proposed project. Implementation of the mitigation measure described under the proposed project would reduce this impact to a less-than-significant level.

4.2.3.9.2 Mitigation. Mitigation would be the same as that described under the proposed project.

4.2.4 Alternative 2—Minimal Channel and Floodplain Modification

4.2.4.1 Impact: Loss of Low-Quality Riparian Scrub and Forest Habitat

4.2.4.1.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Because of the reduced scope of excavation and planting, impacts on existing low-quality riparian scrub and forest habitat under Alternative 2 would be less than those described for the proposed project. This impact associated is considered less than significant.

4.2.4.1.2 Mitigation. No mitigation is required.

4.2.4.2 Impact: Disruption of Wildlife during Breeding Periods

4.2.4.2.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Because of the reduced scope and duration of construction, impacts on wildlife species during breeding periods under Alternative 2 would be less than those described for the proposed project. Implementation of the project BMPs would further reduce this impact. This impact is considered less than significant.

4.2.4.2.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Comply with Migratory Bird Treaty Act* in the *Best Management Practices* section of Chapter 2).

4.2.4.3 Impact: Harm to Anadromous Fish in All Life Stages Resulting from Construction Activities

4.2.4.3.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Because of the reduced scope and duration of construction, impacts on anadromous fish in all life stages resulting from construction activities under Alternative 2 would be less than those described for the proposed project. Implementation of the project BMPs would further reduce this impact. This impact is considered less than significant.

4.2.4.3.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Construction Period Limits* and *Construction-Area Fish Management Measures* in the *Best Management Practices* section of Chapter 2).

4.2.4.4 Impact: Loss of Wildlife Habitat Because of Tree Removal

4.2.4.4.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Because of the reduced scope of excavation and construction, no mature trees would be removed under Alternative 2. Alternative 2 would thus result in no impacts on wildlife habitat because of tree removal.

4.2.4.4.2 Mitigation. No mitigation is required.

4.2.4.5 Impact: Potential Adverse Effects on Fish and Wildlife from Increased Exposure to Mercury

4.2.4.5.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. The extent of the riparian canopy and the percentage of shaded stream surface expected to develop under Alternative 2 would be less than that expected under the proposed project, potentially resulting in the establishment of a greater area of riverine wetland vegetation and in higher methylation rates. In addition, less wetland vegetation would be removed during construction activities under Alternative 2. Impacts on fish and wildlife species associated with increased exposure to mercury under Alternative 2 would thus be greater than those described for the proposed project. Postproject conditions under Alternative 2 would likely be similar to, or slightly improved as compared to, existing conditions. This impact is considered less than significant.

4.2.4.5.2 Mitigation. No mitigation is required.

4.2.4.6 Impact: Temporary Loss of Riverine Wetland Habitat

4.2.4.6.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would also include the installation of structures to stabilize the channel bed and control channel incision. The installation of these structure would impact existing riverine wetland habitat. However, because of the reduced scope of excavation and construction, net impacts on existing riverine wetland under Alternative 2 would be slightly less than those described for the proposed project. This impact is considered less than significant.

4.2.4.6.2 Mitigation. No mitigation is required.

4.2.4.7 Impact: Temporary Effects on Waters of the United States

4.2.4.7.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel. Because implementation of Alternative 2 would result in only one minor modification of the channel planform, temporary effects on waters of the United States would be almost entirely eliminated under Alternative 2. This impact is considered less than significant.

4.2.4.7.2 Mitigation. No mitigation is required.

4.2.4.8 Impact: Loss of Sycamore Alluvial Woodland

4.2.4.8.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Because this alternative incorporates only one minor modification of the channel planform and would restrict excavation to key unvegetated areas, there would be no loss of sycamore alluvial woodland under Alternative 2.

4.2.4.8.2 Mitigation. No mitigation is required.

4.2.4.9 Impact: Loss of Phase 1 Plantings as a Result of Construction

4.2.4.9.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 eliminates the Reach 4 channel planform modification associated with the proposed project; thus, under Alternative 2, there would be no impact on Phase 1 plantings.

4.2.4.9.2 Mitigation. No mitigation is required.

4.2.5 Alternative 3—No Project

4.2.5.1 Impact Analysis

Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project area.

4.2.5.2 Mitigation

No mitigation is required.

4.3 CULTURAL RESOURCES

4.3.1 Methodology and Significance Criteria

The following evaluation of impacts on cultural resources is based on a review of existing literature, a records search at the Northwest Information Center at Sonoma State University, and consultation with the Native American Heritage Commission, interested Native Americans, and the Corps archaeologist. The SHPO was also consulted regarding the eligibility of the two prehistoric sites, CA-SCL-186 and CA-SCL-187.

4.3.1.1 California Environmental Quality Act

According to CEQA, an impact is considered significant if it would disrupt or adversely affect a prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group. The 1999 CEQA Guidelines define four cases in which a property can qualify as a significant historical resource for the purposes of CEQA review.

- The resource is listed in or determined eligible for listing in the California Register of Historical Resources (CRHR).
- The resource is included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code, or is identified as significant in a historical resource survey that meets the requirements of Section 5024.1(g) of the Public Resources Code (unless the preponderance of evidence demonstrates that the resource is not historically or culturally significant).

- The lead agency determines the resource to be significant as supported by substantial evidence in light of the whole record.

- The lead agency determines that the resource may be a historical resource as defined in Public Resources Code Section 5020.1(j) or 5024.1 (14 CCR 3 15064.5).

A historical resource may be eligible for inclusion in the CRHR if it

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

- is associated with the lives of persons important in our past;

- embodies the distinctive characteristics of a type, period, region, or method of construction, represents the work of an important creative individual, or possesses high artistic values; or

- has yielded, or may be likely to yield, information important in prehistory or history.

4.3.1.2 Section 106 of the National Historic Preservation Act

Cultural resources significance is evaluated in terms of eligibility for listing in the NRHP. NRHP significance criteria applied to evaluate the cultural resources in this study are defined in 36 CFR 60.4 as follows:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Significant impacts can occur when prehistoric or historic archaeological sites, structures, or objects listed in or eligible for listing in the NRHP are subjected to the following effects:

- physical destruction or alteration of all or part of the property;
- isolation of the property from or alteration of the property's setting when that character contributes to the property's qualification for the NRHP;
- introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- neglect of a property resulting in its deterioration or destruction; and
- transfer, lease, or sale of the property.

4.3.2 Proposed Project—Channel and Floodplain Modification

4.3.2.1 Impact: Potential Disturbance of Unknown Cultural Resources

4.3.2.1.1 Analysis. All ground-disturbing project activities, such as excavation, planting, installation of structures, bank stabilization, channel modification, and floodplain alteration, have the potential to directly affect unknown cultural resources that are covered by soil deposits or vegetation and thus could not be identified during previous field surveys or test excavations. The Guadalupe River watershed area is very sensitive both for covered archaeological sites and for buried human remains. However, implementation of the project BMPs (see *Best Management Practices* section of Chapter 2) will reduce this potential impact to a less-than-significant level.

4.3.2.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Cultural Resources* in the *Best Management Practices* section of Chapter 2).

4.3.3 Alternative 1—Reduced Channel and Floodplain Modification

4.3.3.1 Impact: Potential Disturbance of Unknown Cultural Resources

4.3.3.1.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Less excavation and planting would take place under Alternative 1 than under the proposed project. Therefore, the potential impact of Alternative 1 on unknown cultural resources would be similar to but less than the potential impact of the proposed project. This potential impact is considered less than significant.

4.3.3.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Cultural Resources* in the *Best Management Practices* section of Chapter 2).

4.3.4 Alternative 2—Minimal Channel and Floodplain Modification

4.3.4.1 Impact: Potential Disturbance of Unknown Cultural Resources

4.3.4.1.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). There would be less excavation and planting under Alternative 2 than under the proposed project or Alternative 1. Therefore, the potential impact of Alternative 2 on unknown cultural resources is similar to but substantially less than the potential impact of the proposed project or Alternative 1. This potential impact is considered less than significant.

4.3.4.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Cultural Resources* in the *Best Management Practices* section of Chapter 2).

4.3.5 Alternative 3—No Project

4.3.5.1 Impact Analysis

Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project area.

4.3.5.2 Mitigation

No mitigation is required.

4.4 HYDROLOGY AND WATER QUALITY

4.4.1 Methodology and Significance Criteria

Sources of information for the analysis of potential project impacts on hydrology and water quality included: the District; the Corps; Tetra Tech, Inc.; and the University of California, California State University, and California State library systems. Journal article databases covering publications in water resources and engineering were also searched for information relating to Guadalupe Creek. In addition to collecting reports, plans, maps, and aerial photographs, Jones & Stokes conducted onsite field investigations. The potential hydrologic and water quality impacts of the proposed project were evaluated qualitatively with respect to the anticipated duration and extent of project construction activities, the sensitivity of existing conditions, the physical characteristics of the project area, and applicable regulatory criteria and guidelines.

Criteria for determining the significance of hydrologic and water quality impacts were based on Appendix G of the CEQA Guidelines and on professional judgment. The project may have a significant impact on the environment if it would:

- violate any water quality standards or waste discharge requirements;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table;
- substantially alter the existing drainage pattern of the site or area in a manner that would result in substantial erosion or siltation onsite or offsite;
- substantially alter the existing drainage pattern of the site or area, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite;
- create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff;
- otherwise substantially degrade water quality;
- place housing within a 100-year flood hazard area;
- place within a 100-year flood hazard zone structures that would impede or redirect floodflows; or

- expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

4.4.2 Proposed Project—Channel and Floodplain Modification

4.4.2.1 Impact: Construction-Related Water Quality Impairment

4.4.2.1.1 Analysis. Site preparation and construction activities, including excavation and grading, will result in substantial soil disturbance and have the potential to cause temporary discharges of soil and sediment into stormwater runoff or directly into the streamchannel. Construction activities also have the potential to discharge hazardous substances into runoff or directly into the streamchannel, including fuel, oils, greases, and other petroleum products that may be released from machinery. The potential water quality impacts depend on the erodibility of soil types encountered, construction practices used, extent of the disturbed area and duration of disturbance, timing of precipitation, and proximity to the stream channel. Soil discharged in stormwater and directly into stream channels or other water bodies could increase turbidity, stimulate the growth of nuisance algae and aquatic plants, and increase sedimentation of habitats used by aquatic organisms. Hazardous substances that enter water bodies could be toxic to aquatic organisms and other terrestrial wildlife that might inhabit the area.

The District will require the construction contractor selected for the project to prepare and implement an approved Erosion Control Plan and Hazardous Material Spill Prevention and Response Plan as part of the SWPPP required under the NPDES stormwater permit regulations. As discussed in the *Best Management Practices* section of Chapter 2, these plans will identify the BMPs to be employed before, during, and after construction to reduce pollution of stormwater runoff from operation of heavy equipment within the streamchannel. Erosion control measures (including management, structural, and vegetative measures) and spill prevention and cleanup measures will be stipulated in the construction specifications before bids are received for the project. As necessary, specific erosion control measures will be required for work conducted within the normal high-water zone of the stream (instream) and for areas above high water or away from the stream channel. All work will be conducted according to site-specific construction plans that identify areas for clearing, grading, and revegetation so that ground disturbance is minimized. Implementation of the project BMPs will reduce this potential impact to a less-than-significant level.

4.4.2.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* in the *Best Management Practices* section of Chapter 2).

4.4.2.2 Impact: Interference with Groundwater Recharge

4.4.2.2.1 Analysis. Two types of project activities could interfere with groundwater recharge in the project area. First, implementation of the proposed project will require that Guadalupe Creek be dewatered during construction. Groundwater levels in the project area are affected by streamflow because the stream is a key recharge point for the aquifer. During construction, streamflow will be diverted at Masson Dam into the percolation pond system. Dewatering of the creek will temporarily affect the rate of percolation into the aquifer because percolation from the ponds is slower than percolation from the creek, but there should be no net loss of water availability. Furthermore, the projected construction period will be relatively short.

In addition to channel dewatering, the proposed project may require the installation of temporary pumping facilities in the adjacent percolation ponds to supply water for irrigation. It is anticipated that irrigation would be required for 2–5 years during plant establishment. Average annual water use for irrigation is estimated to be approximately 30 acre-feet per year.

Given the limited construction period and the minimal amount of water that may be pumped from the percolation ponds, dewatering of the creek and diversion of water for irrigation purposes are expected to have a less-than-significant impact on groundwater recharge and availability.

4.4.2.2.2 Mitigation. No mitigation is required.

4.4.2.3 Impact: Potential Reduction in Flood Conveyance Capacity

4.4.2.3.1 Analysis. The proposed project would not substantially alter the existing hydraulic regime; however, some project features (e.g., IWM, boulders, weirs, stream barbs) have the potential to increase the hydraulic roughness of the channel bed and banks, potentially reducing flood conveyance capacity. The proposed project involves excavating and recontouring channel banks and floodplain surfaces to create suitable planting surfaces for riparian vegetation and to enhance instream habitat diversity. Increased vegetation growth, changes in channel geometry, and the installation of instream fisheries habitat features may affect water depths and velocities in the project reach.

Preliminary HEC-RAS hydraulic modeling was conducted during the initial design phase of the project to assess existing hydraulic conditions and evaluate potential changes associated with alternative restoration designs. Modeling addressed flow depth and velocity at numerous cross-sections on the project reaches for the flood events with 1.5-year, 2-year, 5-year, 10-year, 50-year, and 100-year recurrence intervals. In general, the results suggested that events with recurrence intervals of less than 10 years would be confined to the main channel and would not be affected by backwater effects of bridges or constrictions. Less frequent and larger flow events, including the 50-year and 100-year floods, are expected to spread out onto higher benches within the broader floodplain (Jones & Stokes 1999).

Additional hydraulic modeling will be conducted during the final design phase to ensure that existing hydraulic conditions are maintained or enhanced. Under the proposed project, channel banks and slopes will be excavated to expand the existing floodplain and increase the area of floodplain surfaces inundated at frequent recurrence intervals (i.e., during the 1.5 -and 2-year events). To compensate for potential loss of flood conveyance capacity resulting from increased growth of vegetation in the project area, additional floodplain capacity will be created by excavating channel banks to create high-level floodplain benches in the upstream segment of Reach 4 (Los Capitancillos Freshwater Wetland Project site), and in Reach 2 downstream of the Meridian Avenue Bridge (City parcel). In addition, planting areas will be tapered in key creek segments (e.g., downstream and upstream of the Meridian Avenue bridge, and upstream of the Almaden Expressway bridge) to ensure that bridge openings are unobstructed and flood conveyance capacity is maintained.

Because the proposed project has been designed to maintain existing flood conveyance capacity, this impact is considered less than significant.

4.4.2.3.2 Mitigation. No mitigation is required.

4.4.2.4 Impact: Potential Changes in the Transport of Mercury-Bearing Sediments

4.4.2.4.1 Analysis. Design features associated with the proposed project, such as changes in channel planform and geometry, will affect existing patterns of streambed and bank erosion in the project reach of Guadalupe Creek; thus, it is necessary to consider whether the project may potentially increase downstream sediment transport.

As discussed in the *Hydrology and Water Quality* section of Chapter 3, there has been a general trend toward channel degradation in the upper reaches of the project area during the last 60 years; this has resulted in net loss and downstream transport of sediment from the upstream portion of the site (Jones & Stokes 2000d). At the upstream end of the project area (Reach 4; see Figure 3), flow is now confined to a narrow, steep-sided channel, resulting in elevated flow velocities and active erosion of the channel bed and banks. Samples of bank soils and instream sediments collected from the project area and analyzed for this project all showed elevated levels of mercury (Table 3-5, Table 3-8). Thus, materials entrained and transported in the project reach of Guadalupe Creek as a result of ongoing bank and bed erosion may contain elevated mercury concentrations. Under existing conditions, some of these sediments may be redeposited within the project area; the remainder are likely carried into downstream reaches of Guadalupe Creek and eventually into the Guadalupe River.

The proposed project includes a number of specific design features that are intended to create conditions that will not increase, and may decrease, existing streambed and bank erosion and downstream sediment transport. These features include:

- excavating and recontouring channel banks and slopes to increase floodplain capacity and reduce turbulence;
- reducing the accumulation of sediments with elevated levels of mercury in the stream channel during low-flow periods by concentrating flow in a better-defined low-flow channel (reducing deposition of sediments with elevated levels of mercury in the aquatic environment where methylation could occur);

- planting channel banks and floodplain surfaces (installation of plantings and implementation of project BMPs for soil stabilization will help to control erosion and reduce sediment input to the creek);

- installing bank protection at key locations in the project area where existing erosion threatens infrastructure; and

- installing rootwads and other instream features (e.g., cross weirs, v-weirs) to control erosion and excavating floodplains to reduce channel incision.

Thus, implementation of the proposed project is unlikely to increase the transport of mercury-bearing sediment into areas downstream of the project area, and may even reduce this transport below existing levels. This impact is considered less than significant with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* and *Soil Management Plan* in the *Best Management Practices* section of Chapter 2).

4.4.2.4.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* and *Soil Management Plan* in the *Best Management Practices* section of Chapter 2).

4.4.2.5 Impact: Potential Increase in Formation of Methyl Mercury in the Project Reaches of Guadalupe Creek

4.4.2.5.1 Analysis. As described in Chapter 3, methyl mercury was detected in water column samples taken both within and upstream of the project reach (Table 3-4). Analysis of these data suggests that methylation is occurring under existing conditions in areas of the project reach that support riverine wetland vegetation and in deep pool environments (Tetra Tech pers. comm.). Thus, another issue is whether implementation of the proposed project will increase the potential for formation of methyl mercury in the project reaches of Guadalupe Creek.

The proposed project includes a number of design features specifically intended to create conditions that will not increase, and may decrease, the potential for formation of methyl mercury in the project area. These features include

- creating a better-defined low-flow channel (concentrating flow and reducing stagnancy and anoxic conditions that would encourage methylation under summer and early fall low-flow conditions);

- minimizing the depth of created pools (reducing the potential for development of stagnant and anoxic conditions that would encourage methylation);

- reducing the inchannel accumulation of sediments with elevated mercury levels during low-flow periods by concentrating flow in a better-defined low-flow channel (reducing deposition of sediments with elevated mercury levels in the aquatic environment where methylation occurs);

- removing existing riverine wetland vegetation as a result of construction activities (decreasing the deposition and accumulation of organic matter during and immediately following project construction, leading to a corresponding short-term decrease in methylation potential, although some riverine wetland vegetation will naturally re-establish following project construction);

- decreasing the amount of riverine wetland vegetation and algae within the project reaches over time by substantially increasing the riparian canopy and the percentage of shaded stream surface (resulting in a long-term decrease in the deposition and accumulation of organic matter and a corresponding long-term decrease in methylation potential); and

- decreasing instream water temperatures by substantially increasing the riparian canopy and the percentage of shaded stream surface (decreasing the rate of organic matter deposition/decomposition and accompanying bacterial activity that would encourage methylation).

Thus, implementation of the proposed project is unlikely to result in increased formation of methyl mercury in the project reach. This impact is considered less than significant.

Maturation of the riparian canopy could take as much as 40 years; many of the physical and biological changes associated with the project will occur over an extended period of time. Thus, it is difficult to predict how the physical changes described above will affect methyl mercury formation in a dynamic stream system. Because of the difficulty in predicting changes associated with implementation of the proposed project, the District will implement the following mitigation measure to provide additional assurance that the project will reduce impacts related to increased formation of methyl mercury to a less-than-significant level.

4.4.2.5.2 Mitigation. In conjunction with the Corps, the RWQCB, and other resource and regulatory agencies, the District will be required to develop and implement a program to monitor postproject changes in observed methyl mercury concentrations. Additional baseline monitoring will be implemented before construction at existing sampling locations within and upstream of the project reach; the same sites will be used for preconstruction and postconstruction monitoring.

Monitoring will continue for a minimum of 5 years. Measurements will be taken weekly for 4 weeks after reintroduction of streamflow; after this 4-week period, measurements will be taken quarterly, and will include measurements immediately before and after two storm events. The water samples will be analyzed for total mercury, dissolved mercury, and unfiltered and filtered methyl mercury as well as suspended solids, pH, temperature, dissolved oxygen, and dissolved organic carbon. Samples will be taken at mid-depth, except in pools, where top and bottom samples will be collected. If large changes in water turbidity are evident, samples of suspended solids will be taken and pH and temperature will be measured to characterize the full depth cross section of the creek.

A comparison of data on water samples collected from the upstream sites and from the project reaches of the creek will show whether postconstruction levels of unfiltered and filtered methyl mercury in the project area are increased above baseline concentrations and are substantially increased above upstream concentrations (i.e., increased by a factor of 2 or more). No further investigation will be conducted unless both these conditions are met. If monitoring shows elevated methyl mercury levels, concentrations in the creek will be measured to assess whether increased methyl mercury levels are related to differences in the parameters analyzed. If so, sediment and porewater samples will also be collected and analyzed for methyl mercury, total mercury, sulfide, pH, total organic carbon, and sulfate. A survey of conditions in stream reaches showing elevated mercury levels will be conducted to identify areas where methylation may be occurring.

In addition, if monitoring shows substantial increases in levels of methyl mercury in the project reaches, the District will collaborate with the Corps, the RWQCB, and other resource and regulatory agencies to identify and implement additional measures to reduce methyl mercury levels in the project area. These measures may include, but are not limited to:

- backfilling deep pools with rock or other materials to decrease depth, limit stagnation, and/or ensure oxygenation throughout the full depth of the pool;
- installing additional bank stabilization and/or erosion control features to reduce localized erosion and inchannel deposition; and
- installing additional instream habitat features to further reduce the width of the low-flow channel in order to concentrate flow, reduce stagnancy, and ameliorate anoxic conditions.

Additional monitoring will be implemented to assess the effectiveness of these preventive measures.

4.4.3 Alternative 1—Reduced Channel and Floodplain Modification

4.4.3.1 Impact: Construction-Related Water Quality Impairment

4.4.3.1.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Because of the reduced construction and planting scope, the risk of construction-related water quality impairment under Alternative 1 would be less than that described for the proposed project. Implementation of the project BMPs would reduce this potential impact to a less-than-significant level.

4.4.3.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* in the *Best Management Practices* section of Chapter 2).

4.4.3.2 Impact: Interference with Groundwater Recharge

4.4.3.2.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Because of the scope of construction and planting, the construction period would be shorter under Alternative 1 than under the proposed project. In addition, because the planting area would be reduced, less water would be required for irrigation during the establishment period. The potential impact of Alternative 1 on groundwater recharge would be less than that described for the proposed project. This impact is considered less than significant.

4.4.3.2.2 Mitigation. No mitigation is required.

4.4.3.3 Impact: Potential Reduction in Flood Conveyance Capacity

4.4.3.3.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Although Alternative 1 provides for more limited floodplain expansion than the proposed project, it would include excavation of channel banks to create high-level floodplain benches in the upstream segment of Reach 4 (the Los Capitancillos Freshwater Wetland Project site) and in Reach 2 downstream of the Meridian Avenue Bridge (the City parcel). In addition, under Alternative 1, planting areas would be tapered in key areas (e.g., downstream and upstream of the Meridian Avenue bridge, and upstream of the Almaden Expressway bridge) to ensure that bridge openings are unobstructed, and overall planting densities would be reduced to maintain flood conveyance capacity. Impacts on flood conveyance capacity under Alternative 1 are expected to be similar to those described for the proposed project. This impact is considered less than significant.

4.4.3.3.2 Mitigation. No mitigation is required.

4.4.3.4 Impact: Potential Changes in the Transport of Mercury-Bearing Sediments

4.4.3.4.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Alternative 1 provides for a more limited restoration of natural stream function than the proposed project. Because Alternative 1 would result in less extensive restoration of natural floodplain function than the proposed project, postproject velocities at high flow would likely be somewhat higher with Alternative 1 than with the proposed project, resulting in comparatively greater turbulence, erosion, and sediment transport. Thus, the impact of Alternative 1 on sediment transport and downstream movement of mercury would be slightly more adverse than that described for the proposed project. Postproject conditions with Alternative 1 would likely be similar to or slightly improved as compared to, existing conditions. This impact is considered less than significant.

4.4.3.4.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* and *Soil Management Plan* in the *Best Management Practices* section of Chapter 2).

4.4.3.5 Impact: Potential Increase in Formation of Methyl Mercury in the Project Reach of Guadalupe Creek

4.4.3.5.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. The extent of floodplain surfaces created under Alternative 1 would be less than that under the proposed project; planting density would decrease correspondingly to compensate for reduced flood conveyance capacity. In addition, the extent of the riparian canopy and the percentage of shaded stream surface expected to develop under Alternative 1 would be less than that expected under the proposed project, potentially resulting in the establishment of a greater area of riverine wetland vegetation and in higher methylation rates. This impact is considered potentially significant. Implementation of the mitigation measure described for the proposed project would reduce this impact to a less-than-significant level.

4.4.3.5.2 Mitigation. Mitigation would be the same as that described under the proposed project.

4.4.4 Alternative 2—Minimal Channel and Floodplain Modification

4.4.4.1 Impact: Construction-Related Water Quality Impairment

4.4.4.1.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Less excavation and planting would take place under Alternative 2 than under the proposed project or Alternative 1. The risk of construction-related water quality impairment under Alternative 2 would thus be less than that under the proposed project.

Implementation of the project BMPs would further reduce this potential impact to a less-than-significant level.

4.4.4.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* in the *Best Management Practices* section of Chapter 2).

4.4.4.2 Impact: Interference with Groundwater Recharge

4.4.4.2.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Less excavation and planting would take place under Alternative 2 than under the proposed project or Alternative 1. Because of the reduced scope of project activities, the construction period would be shorter under Alternative 2 than under the proposed project. In addition, because the planting area would be substantially reduced, less water would be required for irrigation during the establishment period. Thus, this impact would be less under Alternative 2 than under the proposed project, and is considered less than significant.

4.4.4.2.2 Mitigation. No mitigation is required.

4.4.4.3 Impact: Potential Reduction in Flood Conveyance Capacity

4.4.4.3.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Although Alternative 2 provides for considerably less floodplain expansion than the proposed project, planting areas would be tapered in key areas (e.g., downstream and upstream of the Meridian Avenue bridge, and upstream of the Almaden Expressway bridge) to ensure that bridge openings are unobstructed, and overall planting densities would be reduced to maintain flood conveyance capacity. Impacts on flood conveyance capacity under Alternative 2 are expected to be similar to those described for the proposed project. This impact is considered less than significant.

4.4.4.3.2 Mitigation. No mitigation is required.

4.4.4.4 Impact: Potential Changes in the Transport of Mercury-Bearing Sediments

4.4.4.4.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Alternative 2 provides for a much more limited restoration of natural stream function than the proposed project; excavation and grading to create low-level floodplain benches would be much less extensive under Alternative 2 than under the proposed project. Postproject velocities at high flow would be substantially higher with Alternative 2 than with the proposed project, resulting in comparatively greater turbulence, erosion, and sediment transport. Thus, the impact of Alternative 2 on sediment transport and downstream movement of mercury would likely be substantially more adverse than that described above for the proposed project. Postproject conditions under Alternative 2 would likely be similar to, or slightly improved as compared to, existing conditions. This impact is considered less than significant.

4.4.4.4.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* in the *Best Management Practices* section of Chapter 2).

4.4.4.5 Impact: Potential Increase in Formation of Methyl Mercury in the Project Reach of Guadalupe Creek

4.4.4.5.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. The extent of floodplain surfaces created under Alternative 2 would be substantially less than that under the proposed project; planting density would also decrease substantially to compensate for reduced flood conveyance capacity. The extent of the riparian canopy and the percentage of shaded stream surface expected to develop under Alternative 2 would be much less than that expected under the proposed project, potentially resulting in the establishment of a greater proportion of riverine wetland vegetation and in higher methylation rates. In addition, under Alternative 2, less wetland vegetation would be removed during construction activities. This impact would be greater than that described for the proposed project. However, postproject conditions under Alternative 2 would likely be similar to, or slightly improved, as compared to existing conditions. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

4.4.4.5.2 Mitigation. Mitigation would be the same as that described under the proposed project.

4.4.5 Alternative 3—No Project

4.4.5.1 Impact Analysis

Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project area. However, because the proposed project has the potential to reduce both downstream transport of mercury-bearing sediment and formation of methyl mercury in the project reach, the effects of the No-Project Alternative may be adverse compared to those of the proposed project.

4.4.5.2 Mitigation

No mitigation is required.

4.5 GEOLOGY AND SOILS

4.5.1 Methodology and Significance Criteria

This evaluation of potential geologic, seismic, soils, and mineral resources impacts is based on the following sources of information: data collected during field surveys; a review of the most current regional information published by the California Department of Mines and Geology (CDMG), the Natural Resources Conservation Service (formerly the Soil Conservation Service) (SCS), and the Association of Bay Area Governments (ABAG); and a review of the project description. Impacts on mineral resources also relied on information gathered from a review of pertinent literature, including local general plans and relevant EIRs.

The following criteria were used to determine the level of significance of potential geologic, seismic, soils, and mineral resources impacts. They were developed based on Appendix G of the State CEQA Guidelines and on professional judgment. The project would result in a significant impact if it would:

- expose humans or property to seismically related hazards, such as earthquake fault rupture, earthquake-induced ground shaking, earthquake-induced liquefaction, earthquake-induced landsliding, and similar hazards, or to secondary damage caused by such events;
- result in a significant increase in the rate of soil erosion and sedimentation by wind or water;
- create substantial risks to life or property as a result of being located on an expansive soil, as defined in the Uniform Building Code (UBC);
- be located on a geologic unit, landform, or soil that is unstable or that would become unstable as a result of the project;
- result in a substantial change in topography or ground-surface relief features;

- result in the loss of availability of a known mineral resource that is valuable to the region and the state; or

- result in the loss of availability of a documented, locally important mineral resource recovery site.

4.5.2 Proposed Project—Channel and Floodplain Modification

4.5.2.1 Impact: Exposure of Humans or Structures to Potential Substantial Adverse Effects Resulting from the Rupture of a Known Earthquake Fault, as Delineated on the Most Recent Alquist-Priolo Earthquake Fault Zoning Maps or Based on Other Substantial Evidence of a Known Fault

4.5.2.1.1 Analysis. No active faults have been identified within the project area and the site is not located within an Earthquake Fault Zone as defined by the State of California for active faults (Hart and Bryant 1997). Therefore, the project area is very unlikely to experience ground surface rupture related to movement on a known active fault (including earthquakes and creep), although this possibility cannot be entirely ruled out because of the area's geologic setting. However, implementation of the proposed project will not result in the construction of structures for human habitation, nor will it significantly increase long-term human use of the project area. Thus, the potential impacts on humans from fault rupture will be less than significant. Similarly, all instream and streamside structures (e.g., maintenance roads) slated for construction or relocation during the implementation of the project will be constructed according to 1997 or latest version UBC guidelines and specifications governing excavation and grading, compaction of soils and fill, and other similar project activities. Construction will also follow relevant 1997 or latest version UBC guidelines regarding construction materials. Therefore, potential impacts on structures are also considered less than significant.

4.5.2.1.2 Mitigation. No mitigation is required.

4.5.2.2 Impact: Exposure of Humans or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death, Resulting from Strong Seismic Groundshaking

4.5.2.2.1 Analysis. The most recent Bay Area Shaking Hazard Maps (Association of Bay Area Governments 1999) indicate that the project area could experience moderate to strong seismic groundshaking during characteristic earthquake events on nearby active faults, including the Calaveras, Hayward, and San Andreas faults. Therefore, implementation of the proposed project could temporarily expose construction personnel to adverse effects resulting from seismic groundshaking. However, the implementation of the proposed project will not result in the construction of habitable structures nor will it significantly increase long-term human use of the project area. Therefore, the potential impacts on humans from seismic groundshaking will be less than significant. Likewise, the potential impacts on instream and streamside structures (e.g., maintenance roads) that will be constructed or relocated during the implementation of the proposed project are considered less than significant because these facilities will be constructed according to 1997 or latest version UBC guidelines and specifications.

4.5.2.2.2 Mitigation. No mitigation is required.

4.5.2.3 Impact: Exposure of Humans or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death, Resulting from Seismically Related Ground Failure, Including Liquefaction

4.5.2.3.1 Analysis. The most recent Bay Area Liquefaction Hazard Maps (Association of Bay Area Governments 1983) indicate that the geologic materials in the general vicinity of the project area are moderately susceptible to liquefaction. Furthermore, Jones & Stokes field surveys indicate that geologic and hydrologic conditions in certain portions of the project area are conducive to seismic ground failure. However, implementation of the proposed project will not result in the construction of habitable structures nor will it increase the likelihood of seismically related ground failure in the project area. Therefore, the potential impacts on humans from seismically related ground failure are considered less than significant. Likewise, the potential impacts on instream and streamside structures (e.g., maintenance roads) that will be constructed or relocated during the implementation of the proposed project are considered less than significant because these facilities will be constructed according to 1997 or latest version UBC guidelines and specifications.

4.5.2.3.2 Mitigation. No mitigation is required.

4.5.2.4 Impact: Exposure of Humans or Structures to Potential Substantial Adverse Effects, Including the Risk of Loss, Injury, or Death, Resulting from Landslides

4.5.2.4.1 Analysis. With the exception of the earthen channel banks and the relatively short slopes between adjoining bench surfaces, slope gradients within the project area are consistently less than 5%. Consequently, the project area is relatively stable and is generally not susceptible to slope failure. Implementation of the proposed project will not change this condition significantly. Therefore, the proposed project will have no landslide-related impacts on humans or structures.

4.5.2.4.2 Mitigation. No mitigation is required.

4.5.2.5 Impact: Substantial Accelerated Soil Erosion

4.5.2.5.1 Analysis. Implementation of the proposed project will involve substantial ground-disturbing activities (including channel realignment, grading, subsoil ripping, and installation of instream bank stabilization structures) that will expose unvegetated soil materials in the project area and along equipment access corridors during project construction. Accelerated erosion and sedimentation could occur as a result. Areas disturbed during construction will likely remain sparsely vegetated and susceptible to accelerated erosion during the initial stages of project operation. Installation of bank stabilization structures during the implementation of the proposed project will help to reduce this impact. During the latter stages of construction and project operation, erosion and sedimentation will decrease substantially because of improved vegetative cover. Implementation of the project BMPs, including preparation of a SWPPP, will reduce this impact to a less-than-significant level.

4.5.2.5.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* in the *Best Management Practices* section of Chapter 2).

4.5.2.6 Impact: Location on a Geologic Unit or Soil that is Unstable or that Would Become Unstable as a Result of the Project and Potentially Result in an Onsite or Offsite Landslide, Lateral Spreading, Subsidence, Liquefaction, or Collapse

4.5.2.6.1 Analysis. As discussed in Chapter 3 above, geologic and hydrologic conditions that are conducive to liquefaction exist in some portions of the project area. However, overall soil and geologic conditions in the project area are relatively stable, and the proposed project will not substantially alter these conditions. Therefore, the potential impacts of the proposed project on soil and substrate stability within the project area are considered less than significant.

4.5.2.6.2 Mitigation. No mitigation is required.

4.5.2.7 Impact: Location on Expansive Soil, as Defined in Table 18-1-b of the 1994 UBC, Creating Substantial Risks to Life or Property

4.5.2.7.1 Analysis. Some soils in the project area may be classified as expansive under the UBC. However, the proposed project will not result in the construction of habitable structures or other structures that are likely to be affected by expansive soils. Therefore, the potential impacts on humans and property from expansive soils will be less than significant. Likewise, the potential impacts on instream and streamside structures (e.g., maintenance roads) that will be constructed or relocated under the proposed project will be less than significant because these facilities will be constructed according to 1997 or latest version UBC guidelines and specifications.

4.5.2.7.2 Mitigation. No mitigation is required.

4.5.2.8 Impact: Location on Soils Incapable of Supporting the Use of Septic Tanks or Alternative Wastewater Disposal Systems in Areas Where Sewers are Not Available for the Disposal of Wastewater

4.5.2.8.1 Analysis. Implementation of the proposed project will not involve onsite wastewater disposal either during project construction or during project operation. Consequently, this project will have no impacts related to onsite wastewater disposal.

4.5.2.8.2 Mitigation. No mitigation is required.

4.5.2.9 Impact: Potential Effects on Mineral Resources

4.5.2.9.1 Analysis. Historically, the area upstream of the project site was mined for mercury. Mining operations ceased in the 1970s. The streambed and terrace deposits of Guadalupe Creek were also once extensively mined for sand and gravel. Currently, the CDMG does not classify the project area as a valuable mineral resource. Furthermore, the surrounding land uses would make the excavation and recovery of any mineral resource difficult. Therefore, the proposed project will have no impact on mineral resources.

4.5.2.9.2 Mitigation. No mitigation is required.

4.5.3 Alternative 1—Reduced Channel and Floodplain Modification

4.5.3.1 Impact Analysis

Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). The potential geologic, seismic, soils, and mineral resources impacts of Alternative 1 would be similar to or slightly less than those described for the proposed project. Implementation of project BMPs, including preparation of a SWPPP, and compliance with 1997 or latest version UBC guidelines would reduce all potential impacts to a less-than-significant level.

4.5.3.2 Mitigation

No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* in the *Best Management Practices* section of Chapter 2) and UBC compliance.

4.5.4 Alternative 2—Minimal Channel and Floodplain Modification

4.5.4.1 Impact Analysis

Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). The potential geologic, seismic, soils, and mineral resources impacts of Alternative 2 would be less than those described for the proposed project. Implementation of project BMPs, including preparation of a SWPPP, and compliance with 1997 or latest version UBC guidelines would reduce all potential impacts to a less-than-significant level.

4.5.4.2 Mitigation

No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan* in the *Best Management Practices* section of Chapter 2) and UBC compliance.

4.5.5 Alternative 3—No Project

4.5.5.1 Impact Analysis

Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project area.

4.5.5.2 Mitigation

No mitigation is required.

4.6 HAZARDS AND HAZARDOUS MATERIALS

4.6.1 Methodology and Significance Criteria

This evaluation of direct and indirect hazards and hazardous materials impacts was based on literature reviews, reconnaissance surveys performed by Jones & Stokes biologists and hydrologists, data provided by Tetra Tech, Inc., information from agency contacts, and a review of the proposed project.

Criteria for determining the significance of hazards and hazardous materials impacts were based on Appendix G of the State CEQA Guidelines and on professional judgment. The project may have a significant impact on the environment if it would:

- encounter hazardous materials during excavation of streambed and bank materials;
- create a significant hazard through the routine transport, use, or disposal of hazardous materials;
- create a significant hazard through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- create a significant hazard through hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school; or
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

4.6.2 Proposed Project—Channel and Floodplain Modification

4.6.2.1 Impact: Potential Hazards to Human Health Associated with Exposure of Newly Excavated Bank Materials with Elevated Mercury Concentrations

4.6.2.1.1 Analysis. Construction activities associated with the proposed project (e.g., excavation and grading to create surfaces suitable for planting riparian vegetation, ripping to prepare surfaces for filling and planting, and installation of bed and bank stabilization) may result in the exposure of soils with higher mercury concentrations than those found at the pre-excavation surface level. Exposure of newly excavated soils with elevated mercury concentrations has the potential to result in adverse effects on the health of construction workers and residents of nearby areas.

Based on the results of the sampling programs described in Chapter 3 under *Hazardous Materials*, mean mercury concentrations in the project area are estimated to be on the order of 10 milligrams per kilogram (mg/kg) at the surface (average of average values from June–July 2000 and September 2000 analyses), 19 mg/kg at the 6-inch sample depth, 19 mg/kg at the 2-foot sample depth, 24 mg/kg at the 5-foot sample depth, and 13 mg/kg at the 10-foot sample depth. Thus, materials exposed by grading and/or ripping on newly created surfaces may have mercury concentrations in excess of the 20 mg/kg hazardous materials threshold or the 23 mg/kg Preliminary Remediation Goal (PRG)[3] for total mercury established by EPA.

The potential for human health effects as a result of exposure to toxic substances depends on the existence of an exposure pathway and on the toxicity of the compound via that pathway. For example, the toxicity of mercury is strongly dependent on the form in which it occurs. The forms of mercury most toxic to humans are: elemental mercury in pure liquid form (usually referred to as metallic mercury); and organic mercury compounds such as methyl mercury. Analysis of samples collected in September 2000 indicates that although the total mercury concentration in bank materials locally exceeds 20 mg/kg, most of the mercury is inorganic. No liquid elemental mercury deposits were found in the sediments or bank soils within the project reach, and no mercury-rich particles were identified by scanning electron microscopy in four sediment samples (Tetra Tech pers. comm.). Sequential leaching tests on selected sediment samples showed that more than 64% of the total mercury consists of the mercury sulfide mineral cinnabar, which is less bioavailable and less toxic than the organic forms of mercury, including methyl mercury. In addition, concentrations of methyl mercury recorded in water and sediment samples collected from the project site in September 2000 ranged from 0.32 nanogram per liter (ng/l) to 0.93 ng/l, and from 0.0004 micrograms per gram (μg/g) to 0.042 μg/g, respectively. These soil concentrations are well below the 6.1 mg/kg PRG for methyl mercury in soils established by EPA (Tetra Tech pers. comm.).

To ensure that worker safety is protected during project construction, the District will require the selected contractor to prepare a Site-Specific Health and Safety Plan (SSHSP) to identify, evaluate, and control safety and health hazards and provide for emergency response. The SSHSP will establish work practices and hazard control measures that will be implemented and personal protective equipment that will be required during project construction to maintain exposure below levels established by the Occupational Safety and Health Agency (OSHA). The SSHP will also identify specific training requirements for the contractor's employees.

Although average mercury concentrations in newly exposed soils are not expected to exceed the 20 mg/kg hazardous materials threshold or the 23 mg/kg PRG, construction activities may expose localized areas with mercury concentrations above these thresholds. This impact is considered significant. Implementation of the following mitigation measure will reduce potential postconstruction health hazards to nearby residents associated with exposure of soils with elevated mercury levels to a less-than-significant level.

4.6.2.1.2 Mitigation. In conjunction with the RWQCB and the Department of Toxic Substance Control (DTSC), the District will develop and implement a program to test soils exposed by excavation or grading or otherwise disturbed by project construction to determine mercury concentrations in the exposed surfaces. Soils with mercury concentrations exceeding 20 mg/kg will be removed and disposed of in a Class I landfill.

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[3] PRGs are used to assess risks related to contaminants in a specific environmental medium (e.g., soil, water, air). The PRGs for soil consider potential pathways via soil ingestion, inhalation, of particulates and volatiles, and dermal absorption. Additional information on PRGs can be obtained from the EPA web site (www.epa.gov).

4.6.2.2 Impact: Potential to Encounter Non-Mercury Hazards or Hazardous Materials during Excavation of Streambed and Bank Materials

4.6.2.2.1 Analysis. Because historic and existing land use in the project area has been primarily agricultural and/or residential, it is unlikely that hazardous materials other than mercury-contaminated soils, sediments, and water will be found in the project area. However, during construction, subsurface hazards such as abandoned underground storage tanks and piping and contaminated material from undocumented dumping and landfilling may be encountered. Specific project impacts resulting from encountering hazardous materials during construction activities could include potential exposure of workers to toxic materials, further contamination of soil and/or groundwater, and/or the need for appropriate disposal of hazardous materials. If hazardous materials are discovered onsite as a result of construction, implementation of the following mitigation measure will reduce this impact to a less-than-significant level.

4.6.2.2.2 Mitigation. In the event that hazards or hazardous materials other than mercury-contaminated soils, sediments, or waters are encountered during construction, all construction activities in the area of the uncovered site will stop and the District will implement the following measures.

- The District will conduct Level I, Level II, and (if required) Level III hazardous materials investigations to identify and delineate the extent of hazardous material contamination within the uncovered area and evaluate potential impacts on project construction.
- The District will verify that all hazardous waste materials removed during construction are handled and disposed of by a licensed waste-disposal contractor and transported by a licensed hauler to an appropriately licensed and permitted disposal or recycling facility, in accordance with federal, state, and local requirements.

4.6.2.3 Impact: Potential Hazard Created Through the Routine Transport, Use, or Disposal of Hazardous Materials

4.6.2.3.1 Analysis. The proposed project will not require the long-term storage, treatment, transport, use, or disposal of hazardous materials; however, small volumes of some hazardous materials will be stored, used, and handled during construction. The hazardous materials likely to be used are the petroleum derivatives and other substances (e.g., gasoline, oils, lubricants, hydraulic fluid, solvents) required to operate construction equipment. These materials could be released in accidental spills. Additionally, the project will require stockpiling and transportation of potentially hazardous mercury-contaminated sediments. Once construction of the proposed project has been completed, no transport, use, or disposal of hazardous materials is expected. Implementation of the project BMPs will reduce this potential impact to a less-than-significant level.

4.6.2.3.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Soil Management Plan* and *Measures to Implement Bay Area Air*

Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities in the *Best Management Practices* section of Chapter 2).

4.6.2.4 Impact: Potential Hazard Created through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment

4.6.2.4.1 Analysis. Project construction activities could result in accidental spills of hazardous materials associated with the operation of construction equipment (e.g., gasoline, oils, lubricants, solvents). Implementation of the project BMPs will reduce this impact to a less-than-significant level.

4.6.2.4.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan*, *Soil Management Plan*, and *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2).

4.6.2.5 Impact: Potential Hazard Created through Hazardous Emissions or Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within 0.25 Mile of an Existing or Proposed School

4.6.2.5.1 Analysis. Five schools are located within approximately 0.25–0.3 mile of the project area. These include: Pioneer High School (public), Dartmouth Middle School (public), and Guadalupe School (public elementary), as well as Beacon School and the Learning Company and Academy (private). No hazardous emissions will be generated by the proposed project; however, excavation, along with stockpiling, sampling, and disposal of excavated materials, will require handling of mercury-contaminated soil and sediments. Implementation of the project BMPs will reduce this impact to a less-than-significant level.

4.6.2.5.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Storm Water Pollution Prevention Plan*, *Soil Management Plan*, and *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2).

4.6.2.6 Impact: Impairment of the Implementation of, or Physical Interference with, an Adopted Emergency Response Plan for the Project Site

4.6.2.6.1 Analysis. Because the proposed project will involve the use of heavy machinery and heavy trucks, emergency access to the site may be temporarily limited. Emergency response times could be affected in areas where construction activities (e.g., parking and staging) take place adjacent to or within road rights-of-way. Implementation of the project BMPs will reduce this impact to a less-than-significant level.

4.6.2.6.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Traffic-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.6.3 Alternatives 1 (Reduced Channel and Floodplain Modification) and 2 (Minimal Channel and Floodplain Modification)

4.6.3.1 Impact Analysis

Both Alternative 1 and Alternative 2 would include restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel modifications would be reduced under Alternative 1 and greatly reduced under Alternative 2. Alternative 2 in particular would include less excavation and less planting than Alternative 1. Both Alternative 1 and Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). The potential hazardous materials impacts of Alternatives 1 and 2 would be similar to those described for the proposed project. However, because excavation and construction would be reduced, human health and other impacts related to exposure of hazards and hazardous materials (including mercury-contaminated soils and sediments) would be less under Alternatives 1 and 2 than those described for the proposed project. Because the volume of excavated material would be less, potential impacts associated with stockpiling, handling, and transport of contaminated spoils would also be less under Alternatives 1 and 2 than those described for the proposed project. Because the duration of construction would be less, potential impacts related to leakage or spillage of fuels and other toxic substances associated with construction equipment, and potential impacts related to impairment of emergency response to the project site and vicinity, would also be less under these alternatives than those described for the proposed project. Implementation of the project BMPs and the mitigation described under the proposed project would reduce all potential impacts to a less-than-significant level.

4.6.3.2 Mitigation

Mitigation would be the same as that described under the proposed project for *Impact: Potential Hazards to Human Health Associated with Exposure of Newly Excavated Bank Materials with Elevated Mercury Concentrations.*

No mitigation is required for other hazardous materials-related impacts with implementation of the BMPs included in the project description (see *Soil Management Plan, Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from*

Soil Removal Activities, and *Measures to Address Traffic-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.6.4 Alternative 3—No Project

4.6.4.1 Impact Analysis

Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project. Because mercury contamination of surface and bank soils is an existing condition, Alternative 3 would result in a continuing risk to human health that is similar to, but less than, that described for the proposed project.

4.6.4.2 Mitigation

No mitigation is required.

4.7 TRANSPORTATION AND CIRCULATION

4.7.1 Methodology and Significance Criteria

Implementation of the proposed project would affect traffic and circulation in the project vicinity by temporarily increasing the number of restoration or construction-related vehicles and heavy trucks on surrounding roadways. Operations or maintenance-related activities would require only occasional inspection visits; therefore, operations-related traffic is considered minimal. Under existing conditions, heavy truck access to the restoration sites would be divided between Almaden Expressway and Camden Avenue. Passenger vehicle access would primarily occur via Meridian Avenue.

Project trip generation is shown in Table 4-1 and is based on an estimate of the numbers of heavy trucks and crew members that would be present during restoration activities. As shown in the table, 10 passenger vehicle trips and as much as 10% of the daily truck trips would occur during the a.m. and p.m. peak hours. In combination, the passenger vehicle trips and the truck trips would generate 18–20 trips. The traffic analysis assumed an increase in traffic during peak commute hours as a worst-case scenario.

Additionally, this analysis assumed that restoration-related activities would involve several types of equipment, including backhoes, scrapers, water trucks, pickup trucks, and front-end loaders.

Table 4-1. Average Daily Project-Related Trip Generation

Type of Vehicle	Number of Vehicles			Resultant Daily Trip Generation[a]			Resultant Peak Hour Trip Generation[b]		
	Proposed Project	Alternative 1	Alternative 2	Proposed Project	Alternative 1	Alternative 2	Proposed Project	Alternative 1	Alternative 2
Passenger vehicles	10	10	10	20	20	20	10	10	10
Heavy trucks	40–50[c]	30-40	10-20	80–100	60-80	20-40	8–10	6-8	2-4
Total	50–60	40-50	20-30	100–120	80-100	40-60	18–20	16-18	12-14

Notes:

[a] Vehicles and trucks accessing the site are assumed to generate two daily trips (one inbound and one outbound).

[b] Estimates of peak hour trip generation are based on 50% of the resultant daily passenger vehicle generation and 10% of the daily heavy truck generation.

[c] This table assumes a 4-month construction/restoration period to complete all excavation and haulage activities.

3.13.3.2 Income Levels

The median household income for zip code 95118 was $47,015 in 1990, which was slightly lower than the City median. Persons in poverty for the 1990 census year numbered 1,920, or 6% of the zip code area's total population of 30,401 people (U.S. Bureau of the Census 1992).

It is assumed that equipment would be stored onsite; estimates of project trip generation do not include daily mobilization and demobilization of construction equipment.

The following criteria were used to determine the level of significance of transportation and traffic impacts. These criteria were developed based on Appendix G of the State CEQA Guidelines and on professional judgment. The project could result in a significant impact if it would:

- cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the roadway system,
- cause an exceedance of an applicable City or County roadway LOS threshold,
- substantially alter the present patterns of circulation or movement,
- substantially increase the traffic delay experienced by drivers,
- result in substantial deterioration of the roadway surface following completion of construction activities, or
- expose people to roadway safety hazards.

For the initial screening of impacts resulting from increased traffic, the Institute of Transportation Engineers (ITE) (1989) recommends that an impact be examined more closely if it involves an increase of 50 or more trucks, 100 passenger vehicles, or an equivalent combination of vehicles per hour in the peak direction during the peak hour at any roadway intersection. For purposes of this analysis, impacts of increased traffic are considered substantial if the number of project-generated vehicle trips would exceed any of these thresholds.

4.7.2 Proposed Project—Channel and Floodplain Modification

4.7.2.1 Impact: Short-Term Increase in Traffic Volumes Resulting from Restoration Activities

4.7.2.1.1 Analysis. The proposed project will generate approximately 10 commute trips by construction/restoration workers during both the a.m. and p.m. peak commute hours. Additionally, between 80 and 100 one-way truck trips per day will be required to haul excavated material to and from the site. Along with the commute trips, as much as 10% or 8–10 of the heavy truck trips will occur during the a.m. and p.m. peak commute hours. In combination, the commute trips and the truck trips will generate 18–20 trips during both the a.m. and p.m. peak hours. Because this total is below the significance threshold of 100 peak-hour trips per day and because the proposed project will not generate a substantial amount of traffic on local roadways, this impact is considered less than significant. However, in order to alleviate possible unforeseen traffic congestion problems during commute hours, project BMPs will be implemented to restrict project-related traffic to non-commute hours. Implementation of the project BMPs will reduce this impact to a less-than-significant level.

4.7.2.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Traffic-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.7.2.2 Impact: Deterioration of Roadway Surfaces

4.7.2.2.1 Analysis. Implementation of the proposed project will temporarily add 100–120 total daily vehicle and truck trips to local and regional roadways. As described above, project-related traffic will not substantially increase traffic on existing state or local roadways, which are maintained and will continue to be maintained by local jurisdictions. Because the number of vehicle trips on the roadway system will not change substantially and because the project-related increase in traffic will be temporary and short-term in nature, no additional maintenance requirements are anticipated for local roadways; therefore, this impact is considered less than significant.

4.7.2.2.2 Mitigation. No mitigation is required.

4.7.2.3 Impact: Potential for Roadway Safety Hazards

4.7.2.3.1 Analysis. Restoration site access points involving heavy trucks (Camden Avenue and Almaden Expressway) have the potential to create roadway operation safety hazards. Large, slow-moving trucks hauling construction equipment and excavated materials in and out of the construction/restoration area may create safety hazards by limiting sight distance. Other construction access points presenting potential safety concerns because of heavy traffic volumes and high speeds include the bridge along Almaden Expressway. Large, slow-moving trucks entering or exiting roadways from these access points could pose a hazard to roadway motorists. However, the implementation of project BMPs will reduce this impact to a less-than-significant level.

4.7.2.3.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Traffic-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.7.3 Alternative 1—Reduced Channel and Floodplain Modification

4.7.3.1 Impact: Short-Term Increase in Traffic Volumes Resulting from Restoration Activities

4.7.3.1.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Because less excavation would take place under Alternative 1, fewer heavy trucks would be needed to move materials to and from the site under Alternative 1 than under the proposed project. In addition, the construction period would likely be somewhat shorter under Alternative 1 than under the proposed project.

An Alternative 1 trip generation analysis shows that while the number of passenger vehicles would remain constant, the number of heavy truck trips would be reduced under Alternative 1. Specifically, the number of trucks would drop to 30–40 per day, which when added to the passenger vehicle numbers gives 80–100 total daily trips. The resultant peak hour trip generation equals 16–18 trips per day. This is considerably lower than the significance threshold of 100 peak-hour trips per day and as a result this impact is considered less than significant. However, in order to alleviate possible unforeseen traffic congestion problems during commute hours, Alternative 1 would incorporate the same project BMPs described for the proposed project to restrict project-related traffic to non-commute hours. Implementation of project BMPs would reduce this impact to a less-than-significant level.

4.7.3.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Traffic-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.7.3.2 Impact: Deterioration of Roadway Surfaces

4.7.3.2.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Implementation of Alternative 1 would add 80–100 daily vehicle and truck trips to local and regional roadways. Because Alternative 1 would not add a substantial amount of traffic on existing roadways, and because the project-related increase would be of shorter duration under Alternative 1 than under the proposed project (as a result of the reduced construction period), no additional maintenance requirements are anticipated. Therefore, this impact is considered less than significant.

4.7.3.2.2 Mitigation. No mitigation is required.

4.7.3.3 Impact: Potential for Roadway Safety Hazards

4.7.3.3.1 Analysis. Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). As with the proposed project, restoration site access points involving heavy trucks would create potential roadway operation safety hazards under Alternative 1, although this effect would be somewhat reduced under Alternative 1 because of the smaller number of heavy truck trips and the shorter construction period. Implementation of project BMPs would reduce this impact to a less-than-significant level.

4.7.3.3.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Traffic-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.7.4 Alternative 2—Minimal Channel and Floodplain Modification

4.7.4.1 Impact: Short-Term Increase in Traffic Volumes Resulting from Restoration Activities

4.7.4.1.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Substantially less excavation would take place under Alternative 2, and fewer heavy trucks would be needed to move materials to and from the site under Alternative 2 than under the proposed project. In addition, the construction period would likely be shorter under Alternative 2 than under the proposed project.

An Alternative 2 trip generation analysis shows that while the number of passenger vehicles would remain constant, the number of heavy trucks would be reduced. Specifically, the number of trucks would drop to 10–20 per day, which when added to the passenger vehicle numbers gives 40–60 total daily trips. The resultant peak hour trip generation equals 12–14 trips per day. This is considerably lower than the significance threshold of 100 peak-hour trips per day and as a result, this impact is considered less than significant. However, in order to alleviate possible unforeseen traffic congestion problems during commute hours, Alternative 2 would incorporate the same project BMPs described for the proposed project to restrict project-related traffic to non-commute hours. Implementation of project BMPs would reduce this impact to a less-than-significant level.

4.7.4.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Traffic-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.7.4.2 Impact: Deterioration of Roadway Surfaces

4.7.4.2.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best*

Management Practices, Chapter 2). Implementation of Alternative 2 would add 40–60 daily vehicle and truck trips to local and regional roadways. Because Alternative 2 would not add a substantial amount of traffic on existing roadways, and because the project-related increase would be of shorter duration under Alternative 2 than under the proposed project (as a result of the reduced construction period), no additional maintenance requirements are anticipated. Therefore, this impact is considered less than significant.

4.7.4.2.2 Mitigation. No mitigation is required.

4.7.4.3 Impact: Potential for Roadway Safety Hazards

4.7.4.3.1 Analysis. Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). As with the proposed project, restoration site access points involving heavy trucks would create potential roadway operation safety hazards under Alternative 2, although this effect would be reduced under Alternative 2 because of the smaller number of heavy truck trips and the shorter construction period. Implementation of project BMPs would reduce this impact to a less-than-significant level.

4.7.4.3.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Traffic-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.7.5 Alternative 3—No Project

4.7.5.1 Impact Analysis

Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project area.

4.7.5.2 Mitigation

No mitigation is required.

4.8 AIR QUALITY

4.8.1 Methodology and Significance Criteria

The proposed project would include several activities that generate air pollutant emissions, including excavation, earthmoving activities, and hauling of excavated soil to landfills or other disposal sites.

Table 4-2 shows the emission estimates for the proposed project. The URBEMIS7G emissions model and construction emission factors developed by the CARB and the EPA were used to estimate construction emissions. Vehicle emissions and dust generation were estimated separately. Vehicle emissions include both on- and off-road vehicle traffic, including employee commute vehicles.

Criteria for determining the significance of air quality impacts were based on Appendix G of the State CEQA Guidelines and on professional judgment. The project may have a significant impact on the environment if it would:

- *conflict with or obstruct implementation of any applicable air quality plan,*
- violate any air quality standard or contribute substantially to an existing or projected air quality violation,
- expose sensitive receptors to substantial pollutant concentrations,
- *result in substantial air emissions or deterioration of air quality, and/or*
- create objectionable odors.

The BAAQMD does not require that construction emissions be quantified when a project is analyzed (Bay Area Air Quality Management District 1996). Within the SFBAAB, any project impact resulting in emissions exceeding the conformity threshold of 50 tons per year of reactive organic gases (ROG) or 100 tons per year of *nitrogen* oxides (NO_x) is considered significant and must be mitigated.

4.8.2 Proposed Project—Channel and Floodplain Modification

4.8.2.1 Impact: Construction-Related Air Emissions

4.8.2.1.1 Analysis. Construction of the proposed project is expected to generate air emissions of less than 5 tons per day for all pollutants (Table 4-2). Consequently, the project will

Table 4-2. Summary of Pollutant Emissions Expected to Result from Proposed Project

	Dust Associated with Soil Removal (tons per year)			Exhaust Emissions (tons per year)			Total Emissions (tons per year)			
Pollutant	Proposed Project	Alternative 1	Alternative 2	Proposed Project	Alternative 1	Alternative 2	Proposed Project	Alternative 1	Alternative 2	Conformity Threshold (tons per year)
ROG	N/A	N/A	N/A	0.4	0.3	0.2	0.4	0.3	0.2	50
NO_x	N/A	N/A	N/A	4.6	3.9	2.8	4.6	3.9	2.8	100
CO	N/A	N/A	N/A	0.4	0.3	0.2	0.4	0.3	0.2	100
PM10	3.5	3.03	2.1	0.04	0.03	0.02	3.54	3.06	2.12	N/A

Note: Estimates of off-road exhaust emissions assume the use of excavation equipment for fill. For dust emissions, a maximum of 3 acres of earth is assumed to be disturbed at any one time.

Source: Bay Area Air Quality Management District 1996.

not exceed the federal conformity thresholds for the SFBAAB. However, emissions generated by construction-related projects in the BAAQMD are considered significant unless the project incorporates all feasible PM10 control measures required by the BAAQMD. Thus, any construction-related emissions generated by the project are considered potentially significant. Implementation of the project BMPs, which include the BAAQMD's provisions for PM10 control, will reduce construction-related air emissions impacts to a less-than-significant level.

4.8.2.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2).

4.8.2.2 Impact: Mercury-Contaminated Dust Associated with Construction

4.8.2.2.1 Analysis. Sampling and analysis conducted for the proposed project have shown that soil and sediments along Guadalupe Creek contain elevated levels of mercury (see *Hazardous Materials* section of Chapter 3). Dust emissions generated by excavation and grading of soils along Guadalupe Creek, and by stockpiling and offhauling of excavated soil and sediments, have the potential to result in adverse health effects on construction workers and residents of nearby areas.

Without implementation of BMPs to reduce construction-related air emissions (see *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2), concentrations of respirable dust (PM10) in the immediate project vicinity have been conservatively estimated at as much as 1,200 micrograms per cubic meter ($\mu g/m^3$) using the SCREEN3 model. Assuming a soil mercury concentration value of 20 mg/kg, the average ambient air concentration of mercury generated by construction activities is calculated as 0.024 $\mu g/m^3$, which is substantially less than the EPA's ambient air PRG for mercury of 0.3 $\mu g/m^3$ established for residential areas. This estimated concentration is also well below the permissible exposure level for airborne inorganic mercury compounds (0.1 mg/m^3) established by OSHA. The potential for health impacts on construction workers and nearby residents as a result of mercury-contaminated dust emissions is thus considered less than significant. However, the District will implement project BMPs (which incorporate the BAAQMD's guidelines for PM10 control; see *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2) to further reduce emissions of mercury-contaminated dust.

4.8.2.2.2 Mitigation. No mitigation is required with implementation of project BMPs (see *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2).

4.8.3 Alternatives 1 (Reduced Channel and Floodplain Modification) and 2 (Minimal Channel and Floodplain Modification)

4.8.3.1 Impact: Construction-Related Air Emissions

4.8.3.1.1 Analysis. Both Alternative 1 and Alternative 2 would include restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel modifications would be reduced under Alternative 1 and greatly reduced under Alternative 2. Alternative 2 in particular would include less excavation, less construction, and less planting than Alternative 1. Both Alternative 1 and Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2).

Construction of the proposed project would generate air emissions of less than 5 tons per day for all pollutants (Table 4-2). Implementation of Alternative 1 or Alternative 2 would likely result in less pollutant generation per day than the proposed project, because less excavation would be required and fewer construction vehicles and heavy trucks would be used. Neither Alternative 1 nor Alternative 2 would exceed the federal conformity thresholds for the SFBAAB. However, emissions generated by construction-related projects in the BAAQMD are considered significant unless the project incorporates all feasible PM10 control measures required by the BAAQMD. Thus, any construction-related emissions generated under Alternative 1 or 2 are considered potentially significant. However, project BMPs for Alternative 1 and Alternative 2 incorporate the BAAQMD's provisions for PM10 control; implementation of project BMPs would thus reduce construction-related air emissions impacts to a less-than-significant level.

4.8.3.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2).

4.8.3.2 Impact: Mercury-Contaminated Dust Associated with Construction

4.8.3.2.1 Analysis. Both Alternative 1 and Alternative 2 would include restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel modifications would be reduced under Alternative 1 and greatly reduced under Alternative 2. Alternative 2 in particular would include less excavation, less construction, and less planting than Alternative 1. Both Alternative 1 and Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2).

Without implementation of BMPs to reduce construction-related air emissions (see *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2), concentrations of respirable dust (PM10) in the immediate project vicinity have been conservatively estimated at as much as 1,200 micrograms per cubic meter ($\mu g/m^3$) using the SCREEN3 model. Assuming a soil mercury concentration value of 20 mg/kg, the average ambient air concentration of mercury generated by construction activities is calculated as 0.024 $\mu g/m^3$, which is substantially less than the EPA's ambient air PRG for mercury of 0.3 $\mu g/m^3$ established for residential areas. This estimated concentration is also well below the permissible exposure level for airborne inorganic mercury compounds (0.1 mg/m^3) established by OSHA. Like the proposed project, the potential for health impacts on construction workers and nearby residents as a result of mercury-contaminated dust emissions is considered less than significant. However, the District will implement project BMPs (which incorporate the BAAQMD's guidelines for PM10 control; see *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2) to further reduce emissions of mercury-contaminated dust.

4.8.3.2.2 Mitigation. No mitigation is required with implementation of project BMPs (see *Measures to Implement Bay Area Air Quality Management District's Feasible Control Measures for PM10 Emissions from Soil Removal Activities* in the *Best Management Practices* section of Chapter 2).

4.8.4 Alternative 3—No Project

4.8.4.1 Impact Analysis. Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project area.

4.8.4.2 Mitigation. No mitigation is required.

4.9 NOISE

4.9.1 Methodology and Significance Criteria

The following evaluation of construction noise impacts was based on the assessment guidelines recommended by the Federal Transit Administration (FTA) (Federal Transit Administration 1995). As a typical worst-case assumption one grader, one loader, and one truck were assumed to be operating simultaneously. The combined sound level of these pieces of equipment is estimated to be 89 dB-L_{dn}. Construction noise levels at various distances from the source point were calculated using a point-source attenuation of 6 dB per doubling of distance.

Criteria for determining the significance of noise impacts were based on Appendix G of the State CEQA Guidelines and on professional judgment. The project may have a significant impact on the environment if it would result in:

- exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, (see *Consultation and Other Requirements* section of Chapter 1),
- exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels,
- a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, or
- a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

For the purpose of assessing the significance of noise impacts associated with the proposed project, a noise impact is considered significant if the proposed project would result in exceedance of noise standards specified in the General Plan (City of San Jose 1994).

4.9.2 Proposed Project—Channel and Floodplain Modification

4.9.2.1 Impact: Temporary Increase in Noise Levels Resulting from Soil Removal Activities

4.9.2.1.1 Analysis. Operation of trucks and excavation equipment would result in a temporary increase in noise levels during daytime hours. Table 4-3 shows estimated construction noise levels in the vicinity of an active construction site and lists the assumptions on which the noise-level calculations were based. As indicated in Table 4-3, sensitive receptors within 1,000 feet of the construction site could be exposed to construction noise in excess of 60 dB-L_{dn}. Therefore, this impact will be significant for residences within 1,000 feet of the project. Implementation of the project BMPs will reduce this impact to a less-than-significant level.

Table 4-3. Estimated Construction Noise in the Vicinity of an Active Construction Site (Distance Attenuation)

Distance to Receptor (feet)	Sound Level at Receptor (dB-L_{dn})
50	89
100	83
200	77
500	68
600	66
800	64
1,000	61
1,500	57

Distance to Receptor (feet)	Sound Level at Receptor (dB-L_{dn})
2,000	54
2,500	51
3,000	48
4,000	44
5,280	40
7,500	33

The following assumptions were used:

Basic sound level drop-off rate: 6.0 dB per doubling of distance
Molecular absorption coefficient: 0.7 dB per 1,000 feet
Anomalous excess attenuation: 1.0 dB per 1,000 feet
Reference sound level: 89 db-Ldn
Distance for reference sound level: 50 feet

Note: This calculation assumes simultaneous operation of one loader, one grader, and one truck.

4.9.2.1.2 Mitigation. No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Noise-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.9.3 Alternative 1—Reduced Channel and Floodplain Modification

4.9.3.1 Impact Analysis

Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Because of the reduced scope of excavation and construction, Alternative 1 would likely require less construction equipment and fewer heavy trucks than the proposed project. Potential impacts would be similar to or less than those described for the proposed project. Implementation of the project BMPs would further reduce this impact to a less-than-significant level.

4.9.3.2 Mitigation

No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Noise-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.9.4 Alternative 2—Minimal Channel and Floodplain Modification

4.9.4.1 Impact Analysis

Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Substantially less excavation and planting would occur under Alternative 2 than under the proposed project. Alternative 2 would thus require less construction equipment and fewer heavy trucks than Alternative 1 or the proposed project. Potential noise impacts would be similar to or less than those described for the proposed project. Implementation of project BMPs would further reduce this impact to a less-than-significant level.

4.9.4.2 Mitigation

No mitigation is required with implementation of the BMPs included in the project description (see *Measures to Address Noise-Related Effects* in the *Best Management Practices* section of Chapter 2).

4.9.5 Alternative 3—No Project

4.9.5.1 Impact Analysis

Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project area.

4.9.5.2 Mitigation

No mitigation is required.

4.10 PUBLIC SERVICES AND UTILITIES

4.10.1 Methodology and Significance Criteria

This impact evaluation was based on the following sources of information: correspondence with agencies and service providers; agency contacts; information gathered from site visits; and a review of pertinent literature including local plans and relevant EIRs.

Criteria for determining the significance of public services and utilities impacts were developed based on Appendix G of the State CEQA Guidelines and on professional judgment. The project could result in a significant impact if it would result in:

- substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered government facilities;
- construction of new facilities that could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, or other public facilities;
- increased use of existing neighborhood and regional parks or other recreational facilities that could increase the probability of substantial physical deterioration;
- construction or expansion of recreational facilities that may have an adverse impact on the environment;
- exceedance of wastewater treatment requirements of the applicable RWQCB;
- construction or need for construction of new water or wastewater treatment facilities or expansion of existing facilities; or
- construction or need for construction of new stormwater drainage facilities or expansion of existing facilities.

The project could also result in a significant impact if

- insufficient water supplies would be available to serve the project from existing entitlements and resources;
- the wastewater treatment provider that serves the project determines that it does not have adequate capacity to meet project demand;

- the project area would be served by a landfill without sufficient permitted capacity to accommodate the project's solid waste disposal needs; or

- the project would fail to comply with federal, state, and local statues and regulations related to solid waste.

4.10.2 Proposed Project—Channel and Floodplain Modification

4.10.2.1 No Impacts

4.10.2.1.1 Police and Fire Protection. The activities associated with the proposed project will have no impact on the level of fire or police protection services. For fire and police protection, service ratios are dependent on the population and response times are dependent on the distance from the service provider to the population. Because this project will not add additional housing units or increase the population of the City, these ratios will not change. Therefore, the proposed project, including the planting of additional habitat, will not increase the number of emergency calls to the area. No mitigation is required.

4.10.2.1.2 Schools and Parks. The activities associated with the proposed project will have no impact on the number of schools or parks needed in San Jose because the proposed project will not increase the population in the area. Depending on the final design of the restoration project and on the public access allowed by the District, the project may have a beneficial impact on the community by providing additional recreational opportunities. No mitigation is required.

4.10.2.1.3 Recreation and Public Access. Public access to the project site is currently restricted to environmental education activities involving local schools. No recreational activities are allowed in and around the creek. The site is used for unauthorized informal recreational activities by residents whose properties border the creek and by Pioneer High School students, because there are no barriers to prevent access. There is no indication that the site will be opened in the future for public use. Because the site will maintain existing operations after the completion of the project, the proposed project will not increase the use of existing neighborhood or regional recreational facilities. In addition, the project will not require the construction or expansion of any existing facilities. The proposed project will have no impact on recreation. No mitigation is required.

4.10.2.2 Impact: Potential Realignment of Infrastructure

4.10.2.2.1 Analysis. The Guadalupe Creek Restoration Project will not require new or physically altered government facilities. Depending on the final restoration design, some private infrastructure facilities, including electric and telephone lines, may need to be realigned, but continuous operations of these services to the public will be maintained. Basic infrastructure in the project area includes sewer, water, storm drains, gas and electric lines, telephone, and cable television, which are conveyed to the public via underground pipes, conduits under bridges, and overhead electrical lines. These facilities will remain largely unaffected. Storm drains are the infrastructure component most likely to be realigned to conform with new channel elevations so that urban runoff will continue to be discharged to the creek. The realignment will be temporary and will not impede runoff; thus it will not result in substantial adverse physical effects. This impact is considered less than significant.

4.10.2.2.2 Mitigation. No mitigation is required.

4.10.2.3 Impact: Increased Demand for Irrigation

4.10.2.3.1 Analysis. The proposed project includes planting of approximately 6 acres of wetland, riparian, and upland vegetation throughout the project area. It is anticipated that these plantings will require irrigation for 2–5 years during plant establishment. Average annual water use for irrigation is estimated to be approximately 30 acre-feet per year and would be supplied from one of the following sources: the existing municipal water supply, the percolation ponds, or the Almaden Valley Pipeline. In addition, long-term evapotranspirative losses resulting from increases in vegetation associated with the proposed project are estimated to be approximately 30 acre-feet per year. Following project construction, existing water management facilities would continue to be operated to maintain a surface-water flow in Guadalupe Creek at the Almaden Expressway bridge of approximately 0.5 cfs. Impacts on water supplies will be less than significant.

4.10.2.3.2 Mitigation. No mitigation is required.

4.10.2.4 Impact: Increased Solid Waste Generation

4.10.2.4.1 Analysis. The City currently generates approximately 1,454,800 tons of solid waste annually. At the current rate of landfill activity (1.8 million tons per year) and assuming an annual increase in solid waste of 1.1%, approximately 24 years of capacity remains in the City's landfills.

The project will remove approximately 42,000 cubic yards of soil and sediment spoils from the site. As discussed in Chapter 3 (under *Hazardous Materials*) some of this material will likely qualify as hazardous waste because of mercury contamination. All spoils that are not considered hazardous waste and that are not reused as onsite fill will be disposed of at the appropriate local landfill, which has adequate capacity to accept all 42,000 cubic yards expected to be excavated. Spoils qualifying as hazardous waste will be disposed of appropriately, as discussed in Chapter 2 and in the *Hazardous Materials* section of this chapter. Sequential leaching tests on selected sediment samples showed that the majority (more than 64%) of mercury in soils and sediments of the project area occurs as the mercury sulfide mineral cinnabar, which is relatively nonvolatile and is not readily leached. Therefore, mercury-contaminated materials disposed of in an appropriate landfill are not expected to volatilize to the atmosphere or to present a significant leaching hazard. Moreover, haulage and disposal of any hazardous materials will comply with all state, federal, and local regulations. This impact is considered less than significant.

4.10.2.4.2 Mitigation. No mitigation is required.

4.10.3 Alternative 1—Reduced Channel and Floodplain Modification

4.10.3.1 Impact Analysis

Alternative 1 would include excavation and restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be reduced. Alternative 1 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Because of the reduced scope of planting, less water would be needed for irrigation and less evapotranspirative loss would take place under Alternative 1 than under the proposed project. In addition, Alternative 1 would only remove approximately 31,000 cubic yards of spoils from the project site. As with the proposed project, disposal sites would be determined based on the mercury concentrations in the spoils. Regardless of the final disposal site(s), the amount of material deposited at each location under Alternative 1 would be less than that for the proposed project. Furthermore, Alternative 1 would not alter existing utilities operations, and would not increase the need for wastewater treatment or stormwater drainage systems. Potential impacts on utility facilities under Alternative 1 would be the same as or less than those described for the proposed project. This impact is considered less than significant.

4.10.3.2 Mitigation

No mitigation is required.

4.10.4 Alternative 2—Minimal Channel and Floodplain Modification

4.10.4.1 Impact Analysis

Alternative 2 would include many of the same restoration features as the proposed project, except that excavation would be limited to selected locations within the 15-foot zone adjacent to the low-flow channel and channel planform modifications would be greatly reduced. Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Alternative 2 would thus require substantially less excavation than either Alternative 1 or the proposed project and would result in fewer plantings. Correspondingly less water would be needed for irrigation and to compensate for evapotranspiration. In addition, Alternative 2 would only remove approximately 11,500 cubic yards of spoils from the project site.

As with the proposed project, disposal sites would be determined based on the mercury concentrations in the spoils. Regardless of the final disposal site(s), the amount of materials deposited at each location under Alternative 2 would be less than that for the proposed project. Furthermore, Alternative 2 would not alter existing utilities operations, and would not increase the need for wastewater treatment or stormwater drainage systems. Potential impacts on utility facilities under Alternative 2 would be the same as or less than those described for the proposed project. This impact is considered less than significant.

4.10.4.2 Mitigation

No mitigation is required.

4.10.5 Alternative 3—No Project

4.10.5.1 Impact Analysis

Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged. No new impacts would result from the continued implementation of District management strategies in the project area.

4.10.5.2 Mitigation

No mitigation is required.

4.11 AGRICULTURAL RESOURCES

4.11.1 Methodology and Significance Criteria

The following evaluation of impacts on agricultural resources was based on information gathered from site visits and a review of pertinent literature including local general plans and relevant EIRs.

Criteria for determining the significance of agricultural impacts were based on Appendix G of the State CEQA Guidelines and on professional judgment. The project may have a significant impact on the environment if it would:

- convert important farmland to nonagricultural use,

- conflict with existing zoning for agricultural use or conflict with a Williamson Act contract, or
- involve other changes in the environment that result in the conversion of farmland to nonagricultural use.

4.11.2 Proposed Project—Channel and Floodplain Modification

4.11.2.1 Impact Analysis

Historically the land around the project site was utilized for agricultural purposes. However, the project site is now in a highly developed area that has been converted to residential use. There is currently no viable farmland within or around the project area. Furthermore, none of the land in the study is under a Williamson Act contract. The implementation of this project will have no impact on existing or potential agricultural lands.

4.11.2.2 Mitigation

No mitigation is required.

4.11.3 Alternatives 1 (Reduced Channel and Floodplain Modification), 2 (Minimal Channel and Floodplain Modification), and 3 (No Project)

4.11.3.1 Impact Analysis

Both Alternative 1 and Alternative 2 would include restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel modifications would be reduced under Alternative 1 and greatly reduced under Alternative 2. Alternative 2 in particular would include less excavation, less construction, and less planting than Alternative 1. Both Alternative 1 and Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged.

Historically the land around the project area was utilized for agricultural purposes. However, the project site is now in a highly developed area that has been converted to residential use. There is currently no viable farmland within or around the project area. Furthermore, none of the land in the study is under a Williamson Act contract. Implementation of Alternative 1, 2 or 3 would have no impact on existing or potential agricultural lands.

4.11.3.2 Mitigation

No mitigation is required.

4.12 AESTHETICS

4.12.1 Methodology and Significance Criteria

The following evaluation of impacts on aesthetics was based on information gathered from site visits and a review of pertinent literature including local general plans and relevant EIRs.

Criteria for determining the significance of aesthetic impacts were based on Appendix G of the State CEQA Guidelines and on professional judgment. The project may have a significant impact on the environment if it would:

- have a substantial adverse effect on a scenic vista,
- substantially degrade scenic resources along a scenic highway,
- substantially degrade the existing visual character or quality of the site and its surroundings, or
- create new sources of substantial light or glare.

4.12.2 Proposed Project—Channel and Floodplain Modification

4.12.2.1 Impact Analysis

The project area is an open-space area characterized by the creek, percolation ponds, individual trees and shrubs, small clusters of riparian vegetation, and annual grasslands. The project proposes to add additional vegetation and restore the site, which should enhance the visual qualities of the area. The site is not located within the visual range of any scenic highway and no new materials will be added to the site that would create a source of light or glare. The implementation of this project will not adversely affect the scenic value of the project site because the additional vegetation will enhance the visual quality of the area and will not substantially impede views of the creek even when the vegetation is mature. The proposed project will have no impact on aesthetics.

4.12.2.2 Mitigation

No mitigation is required.

4.12.3 Alternatives 1 (Reduced Channel and Floodplain Modification), 2 (Minimal Channel and Floodplain Modification), and 3 (No Project)

4.12.3.1 Impact Analysis

Both Alternative 1 and Alternative 2 would include restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel modifications would be reduced under Alternative 1 and greatly reduced under Alternative 2. Alternative 2 in particular would include less excavation, less construction, and less planting than Alternative 1. Both Alternative 1 and Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged.

The project area is an open-space area characterized by the creek, percolation ponds, individual trees and shrubs, small clusters of riparian vegetation, and annual grasslands. Although restoration would be less than under the proposed project, Alternatives 1 and 2 both propose adding vegetation and restoring the site, which should enhance the visual qualities of the area. The project area is not located within the visual range of any scenic highway and no new materials would be added to the site under either Alternative 1 or Alternative 2 that would create a source of light or glare. The implementation of Alternative 1 or 2 would not adversely affect the scenic value of the project site because the additional vegetation would enhance the visual quality of the area and would not substantially impede views of the creek even when the vegetation is mature. Under Alternative 3, there would be no excavation and no planting, and aesthetics of the project area would remain generally unchanged. Alternatives 1, 2, and 3 would not result in a significant impact on aesthetics.

4.12.3.2 Mitigation

No mitigation is required.

4.13 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Because the District may receive federal reimbursement for costs associated with project construction, this project must comply with NEPA. Therefore, this document includes the following discussion of socioeconomic and environmental justice impacts. Consideration of impacts on population and housing is required under both CEQA and NEPA; these issues are also addressed in the following sections.

4.13.1 Methodology and Significance Criteria

The following criteria were used to determine the level of significance of the proposed project's potential socioeconomic and environmental justice impacts. The significance criteria were developed based on CEQ's guidelines under NEPA and on professional judgment. The project could result in a significant impact if it would:

- substantially change local or regional population, employment, or housing;
- disproportionately affect low-income or minority populations;
- induce substantial population growth;
- displace a substantial number of existing housing units, requiring the construction of replacement housing; or
- displace a substantial number of people, requiring the construction of replacement housing.

4.13.2 Proposed Project—Reduced Channel and Floodplain Modification

4.13.2.1 No Impacts

4.13.2.1.1 Population and Housing. The project site is surrounded by urban development. However, the proposed project will not extend beyond the current boundaries of the creek corridor. Therefore, no housing will be demolished or people displaced by the implementation of this project. In addition, the project will not result in any expansion of infrastructure or new development that would cause the population surrounding the project area to increase. The proposed project will have no impact on population and housing.

Because the project site is located near the City of San Jose and is within the largely urbanized southern San Francisco Bay area, this analysis assumes that an ample supply of available construction workers reside within a reasonable commute distance from the project site. The analysis also assumes that these construction workers have already retained housing. Additionally, because the proposed restoration activities are primarily located within the Guadalupe Creek channel, construction-related activities are not anticipated to result in the relocation of any existing residential or commercial structures. Consequently, because the proposed project is not anticipated to result in any local population growth or result in the relocation of any existing structures at the project site, population and housing impacts associated with the proposed project are considered minimal and are not discussed further in this analysis.

4.13.2.1.2 Mitigation. No mitigation is required.

4.13.2.2 Impact: Increase in Temporary Employment in Santa Clara County

4.13.2.2.1 Analysis. Implementation of the proposed project would result in the direct employment of an estimated 10 construction workers and 45 truck drivers. Although the duration of construction and restoration activities is presently unknown, it is anticipated that all construction work would be completed within a relatively short period of time (4–6 months); thus, construction associated with the proposed project would not result in the creation of any new permanent employment opportunities. Additionally, because maintenance-related activities would require only occasional inspection visits, operations-related employment is considered minimal and would likely be performed by existing District staff. Generally, direct impacts on employment would result from expenditures on the design, engineering, and construction of the restoration-related activities. This spending would also result in indirect impacts on local businesses that provide goods and services to the construction firms. Construction positions would also likely be filled by residents of the local area. Because implementation of the proposed project would increase construction-related employment opportunities for local workers, this socioeconomic impact is considered beneficial.

4.13.2.2.2 Mitigation. No mitigation is required.

4.13.2.3 Impact: Continued Health Risk Associated with Consumption of Fish (Environmental Justice)

4.13.2.3.1 Analysis. Recent health advisories have indicated that human consumption of fish caught in the Guadalupe River watershed, including Guadalupe Creek, may pose a hazard to human health. Access to the project site is restricted; however, unauthorized recreational use, including fishing, is known to occur. Although the project area is not considered a low-income or minority area, this pre-existing condition may disproportionately affect low-income populations who depend on fishing in the creek as a food source. Human health risk associated with consumption of fish is a pre-existing condition and no new impacts would result from implementation of the proposed project. However, the District will implement the following mitigation measure to reduce human health risk associated with consumption of fish under existing conditions.

4.13.2.3.2 Mitigation. The District will install warning signs at 100-foot intervals on both sides of the creek along the entire project reach, beginning at the entrance to the creek at Almaden Expressway. The signs will state that fish in the area are contaminated and will list the health risks associated with consumption of the fish. In addition, the signs will include the telephone number of the Santa Clara County Department of Health Services so that the public can contact the Department if necessary. Each sign will be written in English, Spanish, and Vietnamese in order to address the area's diverse population. The District will coordinate with the Santa Clara County

Department of Health Services to determine the exact wording for the signs. If District staff discover during routine maintenance activities that any signs are missing, missing signs will be reported and replaced immediately.

4.13.3 Alternatives 1 (Reduced Channel and Floodplain Modification), 2 (Minimal Channel and Floodplain Modification), and 3 (No Project)

4.13.3.1 Impact Analysis

Both Alternative 1 and Alternative 2 would include restoration components similar to those described for the proposed project, except that excavation would be limited to the 15-foot zone adjacent to the low-flow channel and channel modifications would be reduced under Alternative 1 and greatly reduced under Alternative 2. Alternative 2 in particular would include less excavation, less construction, and less planting than Alternative 1. Both Alternative 1 and Alternative 2 would incorporate all of the BMPs described for the proposed project (see *Best Management Practices*, Chapter 2). Under the No-Project Alternative, current management operations of the site would continue and existing conditions would remain generally unchanged.

Alternatives 1 and 2 would result in impacts similar to those described for the proposed project, including the increase in temporary employment in Santa Clara County. Under Alternative 3, no temporary employment related to construction would be generated. The health risk associated with consumption of fish would continue under Alternatives 1, 2, and the No-Project Alternative.

4.13.3.2 Mitigation

No mitigation is required, except for the health risk associated with consumption of fish, which would continue under Alternatives 1, 2, and 3. Mitigation for the continued health risk would be the same as that described for the proposed project.

Chapter 5. Cumulative Impacts and Other Required Analyses

5.1 CUMULATIVE IMPACTS

5.1.1 Approach

Under both CEQA and NEPA, the term *cumulative impacts* refers to two or more individual effects that, when considered together, are considerable or compound or increase other environmental impacts. A cumulative impact is the change in the environment that results when the impact of a proposed project is added to the incremental impacts of past, present, and reasonably foreseeable future projects, regardless of the person or agency that undertakes such other projects. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (State CEQA Guidelines, Section 15355; 40 CFR 1508.7).

Both CEQA and NEPA require that cumulative impacts be considered when determining whether a project significantly affects the environment. CEQA requires that lead agencies identify related projects through a list or projection approach, summarize effects of the related projects, reasonably analyze the cumulative impacts of the proposed project, and recommend mitigation measures for the significant cumulative impacts (CEQA Guidelines Section 15130[b]). Under the list approach, the lead agency must identify all past, present, and probable future projects that could contribute to a significant impact. In lieu of the list approach, a lead agency may base the cumulative analysis on a summary of projections in an adopted general plan or related planning document. The District and the Corps have determined that a project list approach is appropriate for analysis of cumulative impacts associated with the proposed project.

5.1.2 Projects Addressed in the Cumulative Impact Analysis

Nine projects and programs in addition to the proposed project have recently been proposed or approved within the Guadalupe River watershed. These projects and programs have the potential to produce cumulative impacts on resources in the proposed project area and the Guadalupe River watershed area. These projects are discussed in detail below. They are the:

- Guadalupe River Project in downtown San Jose,
- Santa Clara Valley Water District Fish Ladder Construction Program,
- Upper Guadalupe River Flood Protection Project,
- Lower Guadalupe River Flood Protection Project,
- Fisheries and Aquatic Habitat Collaborative Effort (FAHCE),
- Guadalupe Fisheries Management Plan,
- Los Capitancillos Freshwater Wetland Mitigation Site Development Project,
- Santa Clara Valley Water District Maintenance Program, and
- Total Maximum Daily Load (TMDL) Program.

5.1.2.1 Guadalupe River Project, Downtown San Jose (Downtown Project)

5.1.2.1.1 Overview. The Downtown Project is a flood protection project located adjacent to downtown San Jose (Figure 1a). The original Authorized Project, as modified in 1990 and 1991, provided for flood protection and included recreational elements of the local Guadalupe River Park Plan. Project plans provided for the construction of flood protection elements along the 2.6-mile downtown reach in several phases, or segments.

- Segment 1, the most downstream reach, is located between I-880 and Hedding Street. This reach included an overflow area with a planting bench and armoring on the eastern and western banks and portions of the channel invert near I-880.

- Segment 2 is located between Hedding Street and Coleman Avenue. This reach also included an overflow area with a planting bench and armoring on the eastern and western banks and portions of the channel bed downstream from the Coleman Avenue Bridge.

Construction of the Authorized Project began in 1992. Flood protection components in Segments 1, 2, and 3C Phase 1 have been completed. The flood protection and recreation components in Segments 1 and 2 were completed in 1994 and 1996, respectively. The flood protection components in Segment 3C Phase 1 were completed in 2000.

5.1.2.1.2 Proposed Modifications. Modification and implementation of the remaining components of the Downtown Project are now proposed. These modifications are intended to accomplish the following objectives.

- Provide 100-year flood protection for the downtown San Jose area.
- Protect species recently listed or proposed for listing under the ESA.
- Meet conditions for water quality certification under the CWA.
- Refine recreational opportunities along the Guadalupe River corridor.
- implement mitigation commitments specified in the Downtown Project MMP.

Recommended modifications to the Downtown Project include (1) construction and operation of an underground bypass system to convey floodwaters around important riparian habitat, (2) expanded onsite and offsite mitigation, and (3) modification of riverfront features to accomplish habitat and recreational goals.

Proposed modifications to the Downtown Project would affect several segments of the Guadalupe River in the downtown area of the City. Segment 3A is between Coleman Avenue and New Julian Street. Segment 3B extends from New Julian Street to Park Avenue. Segment 3C Phase 3 is at the upstream end of the project near I-280. Proposed modifications include construction of flood protection features, including bypasses in Segments 3A and 3B during 2001–2002 and in Segment 3C Phase 3 during 2002. Installation of riparian vegetation mitigation within Segment 1 began in 1994 and was substantially completed in 1999. Installation of riparian vegetation mitigation within Segment 2 began in 1998 and was substantially completed in 1999. Installation of SRA cover mitigation began in 1999 and will continue through 2002. Installation of anadromous fish habitat mitigation began in 1994 and will continue through 2002.

The Downtown Project previously proposed concrete armoring for most of the riverbank and river bottom in Segments 3A and 3B. That project would have had significant effects on riparian habitat and SRA cover that would result in adverse thermal impacts to fish habitat. Analyses indicated that no mitigation plan could be developed to mitigate these anticipated thermal impacts. The bypass system now proposed would reduce the amount of riparian vegetation and SRA cover affected while still meeting the original goal of providing flood protection to downtown San Jose and vicinity. The proposed bypass system also would significantly reduce the need for riverbank and river bottom armoring. A bypass system was selected as the best method for avoiding or minimizing effects on riparian resources and on federally listed fish and wildlife species. The bypass system would run underground on the east side of the Guadalupe River from the vicinity of West Santa Clara Street and St. John Street to Coleman Avenue.

The environmental commitments of the project include measures to fully compensate for effects associated with construction, operation, and maintenance. A riverwalk trail system will be developed between Coleman Avenue and Park Avenue. Trails will be asphalt paved and 12 feet wide. Combined maintenance roads/trails will be 18 feet wide with 12 feet asphalt paved. The riverwalk system will accommodate both flood protection maintenance use and the estimated 1.3 million annual visitors to the project area.

A Draft EIR/Supplemental EIS was issued in June 2000. A Final EIR/SEIS will be issued in January 2001. Construction and mitigation activities associated with the Downtown Project modification would be initiated in the summer of 2000 and be substantially complete by 2002.

5.1.2.2 Santa Clara Valley Water District Fish Ladder Construction Program

The District has almost completed a comprehensive program to remove barriers to fish and/or install fish ladders at barriers on Upper Penitencia Creek, Coyote Creek, the Guadalupe River, and Guadalupe Creek. On the Guadalupe River, partial barriers at the Hillsdale Avenue crossing and downstream from the confluence of Ross Creek and the Guadalupe River have been removed. In addition, vortex rock weirs were constructed in late 1998 that allow for upstream and downstream migration of salmonids. In November 1999, a step-pool fish ladder was constructed on the east bank of the Guadalupe River at the Alamitos drop structure downstream from Coleman Road. The ladder allows migrating salmonids to reach the upper watershed areas, including Alamitos Creek, Arroyo Calero, and Guadalupe Creek. Nine trees and 82 lf of SRA cover vegetation were affected by the project. Project impacts were mitigated directly upstream from the project site; the mitigation included planting 18 trees to create a minimum of 82 lf of SRA cover vegetation. Up to 0.17 acre of wetlands would be affected by the project. This wetland habitat is expected to recover naturally.

The District is also constructing a fish ladder on Guadalupe Creek at Masson Dam, downstream from Camden Avenue. The purpose of the project is to provide passage for salmonid adults upstream and juveniles downstream past the existing dam, pursuant to the April 1997 Memorandum of Understanding (MOU No. 0228-97) between the District and the California Department of Fish and Game.

5.1.2.3 Upper Guadalupe River Flood Protection Project

The Upper Guadalupe River Flood Protection Project (Upper Guadalupe River Project) has been proposed by the District to reduce the potential for flood damage along the upper Guadalupe River. The project includes channel modifications along eight reaches of the upper Guadalupe River. Proposed channel modifications include constructing bypass channels, widening the channel, adding benches, lining portions of the channel bank with gabions and cribwalls, and constructing floodwalls and levees. These modifications are designed to increase the capacity of the Guadalupe River. The project has a total length of approximately 6.4 miles and is divided into two discrete segments: one from Highway 101 to I-880 (Reach A) and another from I-280 to above Blossom Hill Road (Reaches 6 to 12). Modifications also have been proposed on adjacent portions of two tributaries, Canoas Creek and Ross Creek. Construction of the Upper Guadalupe River Project is expected to take place over the 25-year period from 2000 through 2025. Expected flows from a flood protection project in the upper Guadalupe River were included in the modeling of the design floodflow for the Downtown Project as described above.

The Corps' 1985 Guadalupe River Interim Feasibility Report and EIS (U.S. Army Corps of Engineers 1985; Section 1.6.1 *Guadalupe River Interim Feasibility Report and Environmental Impact Statement* [1985]) did not find economic justification for proposed channel modifications upstream from I-280. The District, in the late 1980s, initiated an independent planning study for the Upper Guadalupe River Project. Planning and design of the Upper Guadalupe River Project continued concurrent with construction of Segments 1 and 2 of the Downtown Project. In 1997, the District and the U.S. Army Corps of Engineers, San Francisco District, prepared a draft EIR/EIS for the Upper Guadalupe River Project (Santa Clara Valley Water District and U.S. Army Corps of Engineers 1997).

A Final EIR/EIS (Volumes VI, VII, and VIII) was completed in November 1999, but its public release was delayed until July 2000, pending the completion of Volume IX (Santa Clara

Valley Water District and U.S. Army Corps of Engineers 2000), which included a revised cumulative impact analysis addressing a post-1995 flood reassessment of the lower reaches of the Guadalupe River to Alviso Slough and the reaches' ability to convey floodflows. Because this reassessment identified a need to provide additional flood control modifications in these lower reaches, the Lower Guadalupe River Flood Protection Project (see below) was initiated.

The Upper Guadalupe River Project, as presently proposed, will affect approximately 10.45 acres of riparian vegetation, 4,886 lf of SRA cover vegetation, and 1.47 acres of wetlands. Other impacts of the Upper Guadalupe River Project include short-term elevations in instream water temperatures and a net decrease in the amount of inchannel armoring. Informal consultation with USFWS on this project was completed in 1997. No adverse impacts on listed terrestrial vertebrates or plants were identified.

Channel modifications proposed under the Upper Guadalupe River Project would result in beneficial impacts on stream ecology, hydrology, and fisheries. These include permanently fixing the concrete apron and weir at Hillsdale Avenue (Reach 10C) and a low-flow vehicle crossing downstream from Ross Creek (Reach 11B) to provide improved passage for fish (interim fixes were completed in November 1998). Both structures are potential barriers to upstream migration by adult salmon and steelhead. Only during peak urban storm runoff or prolonged watershed runoff are flows high enough to allow successful fish passage. Permanently fixing the interim structures would improve access for migrating fish from San Francisco Bay upstream to the drop structure above Blossom Hill Road. The District would also move Stream Gage Station No. 23B, a partial barrier to fish migration, from its location in the vicinity of Pearl Avenue Bridge downstream to the vicinity of the northbound Almaden Expressway bridge (Reach 10B). The new stream gage will be constructed so that it will not be a barrier to fish migration. Stepped pools would be constructed at the Ross Creek confluence and at the Alamitos drop structure upstream from Blossom Hill Road.

The District would also improve fish passage conditions on Guadalupe Creek at Stream Gage Station No. 43 and at a concrete-channel reach midway between the Pheasant Creek-Guadalupe Creek confluence and Reynolds Road to provide access for migrating fish to an additional 1.3 miles of stream habitat upstream from Masson Dam. In addition, the District proposes to provide for fish passage at the gabion structure on Alamitos Creek upstream from Mazzone Drive and at Stream Gage Station No. 16 on Alamitos Creek. These improvements would provide access for migratory fish to approximately 10.9 miles of upstream fish habitat. Vortex rock weirs would be constructed between Willow Glen Way and Branham Lane (Reaches 9, 10, and 11) to provide instream cover and deepen the feeding areas for fish in the riffle reach of the channel. The weirs would act as a grade-control structure and prevent upstream lateral migration, bank erosion, and aggradation. They would also maintain a low width-to-depth ratio, which would reduce the likelihood of sand or gravel bar deposition and maintain the sediment transport capacity of the stream. The project would remove approximately 5,930 lf (134,400 square feet) of rubble in the construction area. Approximately 3,375 lf (0.6 bank mile; 84,300 square feet) would become natural bank. The Upper Guadalupe River Project is also expected to reduce the frequency and severity of bank erosion, thereby improving water quality. The proposed riparian mitigation also would provide a more continuous riparian corridor along the upper Guadalupe River by reducing the number and lengths of gaps in riparian vegetation.

5.1.2.4 Lower Guadalupe River Flood Protection Project

The proposed Lower Guadalupe River Flood Protection Project (Lower Guadalupe River Project) includes flood protection measures on the Guadalupe River between I-880 and the Alviso Union Pacific Railroad (UPRR) Bridge. The entire length of this project has earthen levees on both banks.

In 1985, during the planning and design of the Downtown Project, it was understood, based on the best available information, that the lower Guadalupe River had adequate capacity to safely convey the 100-year design floodflow of 17,000 cfs (U.S. Army Corps of Engineers 1985). No adverse impacts on lower Guadalupe River hydrologic or hydraulic conditions were expected as a result of the Downtown Project. In a 1991 agreement with the Corps, the District certified that the lower Guadalupe River had the capacity to safely convey the 100-year design floodflow.

After the January and March 1995 storm events on the Guadalupe River, the District initiated studies to reassess the conveyance capacity of the lower Guadalupe River. In 1998, the District completed the analysis and concluded that the lower Guadalupe River below I-880 does not have sufficient capacity to convey the 100-year design floodflow of 17,000 cfs. From Trimble Road downstream to the town of Alviso, channel capacity has been reduced by approximately 40%, primarily because of sediment deposition. In addition, the hydraulic modeling of the lower Guadalupe River used in the analysis assumed that vegetation in the river is mature, which results in an increase in channel roughness. This assumption decreased the modeled capacity of the lower Guadalupe River.

The District is developing the Lower Guadalupe River Project to restore the channel capacity between I-880 and the Alviso UPRR Bridge and to identify alternative measures for conveying floodflows downstream from the Alviso UPRR Bridge. The Lower Guadalupe River Project would be implemented by the District to restore the channel capacity guaranteed in the District's 1991 agreement with the Corps. The Lower Guadalupe River Project will provide channel capacity to convey flows from the Downtown Project and the Upper Guadalupe River Project.

The Lower Guadalupe River Project EIR/EIS will address a full range of alternatives for flood protection downstream from I-880 and will address conveying flood flows downstream from Alviso. The alternatives will be designed to contain the increased flows that would result from the operation of the Downtown Project and the Upper Guadalupe River Project and to minimize or avoid impacts on environmental resources in the Guadalupe River watershed, including listed species and their habitat. Flood protection elements could include raising existing levees, setting levees farther back from the river, constructing offstream storage, constructing flood bypasses, dredging the channel, or a combination of some or all of these elements. The Lower Guadalupe River Project EIR/EIS will address the potential direct, indirect, and cumulative impacts of each alternative on natural resources in the Guadalupe River watershed, including the Alviso Slough area. The District will consult with USFWS's Endangered Species Division regarding the potential hydrologic and hydraulic impacts of the Lower Guadalupe River Project. If an impact is identified, appropriate mitigation measures will be included in the EIR/EIS and BA for the Lower Guadalupe River Project, and the District will prepare an MMP for the Lower Guadalupe River Project for review and approval by the Endangered Species Division.

The EIR/EIS and BA for the Lower Guadalupe River Project will also address the cumulative impacts of all projects in the Guadalupe River watershed that would affect the river's resources. The analysis of cumulative impacts will include, but not be limited to, the Downtown Project, the Upper Guadalupe River Project, and the Lower Guadalupe River Project. Construction of the Upper Guadalupe River Project and the Downtown Project would not foreclose or limit options to develop appropriate mitigation for cumulative impacts determined in the Lower Guadalupe River Project EIR/EIS.

The Lower Guadalupe River Project EIR/EIS will identify alternatives and evaluate the potential impacts of each alternative. To estimate potential impacts of the Lower Guadalupe River Project for this cumulative impact analysis, two alternatives for the Lower Guadalupe River Project that encompass the potential range of impacts of the project have been considered. One alternative would restore the original design capacity by removing sediment from the entire channel between Highway 101 and the Alviso UPRR Bridge. This alternative focuses on instream modifications and represents an alternative at the upper range of expected impacts. This alternative could result in the temporary removal of approximately 65 acres of wetlands and affect an estimated 30 acres of other waters of the United States. An estimated 2.5 acres of riparian habitat, including SRA cover vegetation, could be removed, primarily downstream from Montague Expressway. Most of the temporary impacts on wetlands would be self-mitigating because the wetlands would be likely to reestablish. However, the types of species in the wetlands and their distribution may be different. It may also take several seasons for wetlands to reestablish throughout the channel. The significance of this change has not been evaluated nor have all potential mitigation options. However, impacts on riparian habitat will be mitigated.

An alternative at the lower range of expected impacts would avoid instream work. Such an alternative could include flood bypasses, raising levees, setting back levees, constructing offstream storage, and combinations of these techniques. This alternative would avoid impacts on wetlands and SRA cover vegetation and minimize impacts on riparian habitat, aquatic resources, water quality, and aesthetic resources. It is likely that the selected project alternative ultimately will be a combination of many options, such as instream and out-of-channel structural modifications and modifications to operations and maintenance practices. Between the Alviso UPRR Bridge and the confluence of Alviso Slough with Coyote Creek and San Francisco Bay, potential modifications may be required to reduce the Guadalupe River-induced flooding effects. Possible measures include raising existing levees, building new floodwalls, setting levees farther back from the slough, establishing a floodplain terrace, and combinations of these alternatives.

This cumulative impact analysis assumes that a combination of instream and out-of-channel structural modifications will be implemented between Highway 101 and the Alviso UPRR Bridge as part of the Lower Guadalupe River Project. The analysis also assumes that a combination of floodwalls/levees and a floodplain terrace will be implemented downstream from the Alviso UPRR Bridge in the Alviso Slough area.

Because of the reduced capacity of the lower Guadalupe River, the potential for flooding between I-880 and the Alviso UPRR Bridge would increase if Downtown Project were to be operated without the flood protection provided by a flood protection project in the lower Guadalupe River. Therefore, the Downtown Project would not be made operational until the Lower Guadalupe River Project has been completed. Until the Lower Guadalupe River Project is operational, all bypasses will remain closed with bulkheads and the flood training walls in Segment 3C will remain unfinished.

5.1.2.5 Fisheries and Aquatic Habitat Collaborative Effort

The Guadalupe River, Coyote Creek, and Stevens Creek provide habitat for a variety of aquatic resources, including fall-run chinook salmon and steelhead. Many activities, including water management, urban encroachment, land uses, agricultural use, reclamation, flood protection, and water supply operations by the District, cause concern for the condition of the public trust resources and the quality and availability of instream habitat in the river and creeks. These activities also raise concern about the economic and social impacts of efforts to significantly alter the existing flow regimes of the river and creeks. The District has been named in a complaint filed before the SWRCB for violations of the California Fish and Game Code, the California Water Code, and Public Trust Doctrine related to the District's incremental contribution to the cumulative impacts on chinook salmon and steelhead and their habitat within the river and creeks. The complaint alleges harm to coldwater fisheries as a result of consumptive urban and agricultural water uses in Santa Clara County. To address this complaint, the FAHCE has been initiated jointly by the District and DFG.

The FAHCE will identify factors limiting steelhead and chinook salmon populations in the Guadalupe River, Coyote Creek, and Stevens Creek watersheds. Both flow and nonflow measures will be considered by the FAHCE when addressing the complaint. Participants include the District; DFG; Guadalupe-Coyote Resource Conservation District, Pacific Coast Federation of Fishermen's Associations, and Trout Unlimited, as represented by NHI; NMFS; USFWS; and the City. The FAHCE study is expected to be completed in 2001.

5.1.2.6 Guadalupe Fisheries Management Plan

The expected goal of the District's Guadalupe Fisheries Management Plan is to develop a comprehensive management plan to preserve, protect, and enhance the fishery and aquatic resources of the Guadalupe River and those tributaries capable of supporting or contributing to these resources.

The Guadalupe Fisheries Management Plan is in the early preplanning stages. The expected objectives of the plan are to:

- provide guidance for fisheries habitat protection and restoration in the Guadalupe River watershed;
- identify actions the District can take to maintain and improve existing habitat for native fish;
- facilitate communication with stakeholders, including environmental organizations, the public, and regulatory/resource agencies;
- provide a focus for the District's BMPs, program and project coordination, and budgeting for the Guadalupe River watershed;
- provide a coordinated effort to protect and mitigate impacts on fishery resources associated with construction projects, operations, and maintenance tasks;
- encourage innovative solutions for improving aquatic habitat; and
- act as a catalyst for native fish enhancement efforts in South Bay streams.

5.1.2.7 Los Capitancillos Freshwater Wetland Project

The Los Capitancillos Freshwater Wetland Mitigation Site Development Project is proposed on District-owned property adjacent to the Guadalupe Creek Restoration Project site near Masson Dam. The District is proposing to implement a wetland mitigation project that would include the construction of a seasonal freshwater wetland with an area of as much as 5 acres. The wetland will provide habitat for common seasonal freshwater plants and associated vertebrate and invertebrate species. The District-owned parcel is currently a relatively flat, open, weedy field. The schematic design phase of the project is scheduled to be completed by March 2, 2001. The Engineer's Report and the environmental documents for this project are scheduled to be completed by fall 2001.

The preliminary design concept for the project consists of either a single wetland basin or two interconnected wetland basins. Water will flow into the southwest end of the wetland from the District's Almaden Valley pipeline. The proposed design will also include a berm that will restrict Guadalupe Creek floodflows from entering the Los Capitancillos site. No surface water from the wetland mitigation site will flow into Guadalupe Creek under the existing conceptual plan. Because the site is in a residential area, it is anticipated that the final design will include passive recreational features, such as a pedestrian walkway, wildlife viewing areas, and interpretive signs, as well as vegetation barriers or fences.

5.1.2.8 Santa Clara Valley Water District Maintenance Program

The District is currently considering implementing the District Maintenance Program (Maintenance Program) and is preparing a Maintenance Program EIR to address potential impacts. The EIR will address the impacts of sediment removal, erosion protection, vegetation control, and other program elements on a program level. Alternative methods of accomplishing the work and BMPs will be presented. Any residual impacts that remain after BMPs are implemented will be identified and mitigated.

5.1.2.9 Total Maximum Daily Load Program

The CWA includes a number of provisions and specifies a variety of programs aimed at improving and maintaining national water quality. CWA Section 303(d) requires states to prepare a list of waters within the state that do not currently meet water quality standards. Section 303(d) also requires preparation of TMDL for those waters identified by the state as impaired, where traditional local controls have not resulted in full compliance with the standards. A TMDL is a quantitative assessment of a water quality problem. This can include a pollutant, such as heavy metals or pesticide, or a physical propoerty of the water, such as dissolved oxygen or temperature. A TMDL qualitatively establishes the amount of pollutant in a water body and specifies an allowable load of the pollutant from individual sources that assure water quality standard compliance and beneficial use protection.

Several waterways within the Guadalupe River watershed including Guadalupe Creek and Guadalupe River have been listed on the state's Section 303(d) list of impaired waters. Impairment of water contact recreation beneficial uses through unsafe levels of mercury present in the tissues of sport fish constitutes a violation of the RWQCB's narrative water quality objective for bioaccumulation of toxic contaminants. In response, the RWQCB has prepared a work plan for Guadalupe River watershed mercury TMDL preparation, with a final TMDL and implementation plan scheduled for completion in 2003/2004.

5.1.3 Cumulative Impact Analysis for Proposed Project and Alternatives

The following analysis relies substantially on the cumulative impact analysis that was prepared for the recent draft EIR/EIS for the Downtown Project prepared by the District and the Corps (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). That analysis included a thorough discussion of all of the potential cumulative impacts associated with projects proposed and approved within the Guadalupe River system. The cumulative impact analysis for the Downtown Project is being refined in the final EIR/EIS for that project to reflect the most recent planning efforts for the Guadalupe Creek Restoration Project. The cumulative impact analysis included in the Downtown Project EIR/EIS is hereby incorporated by reference. In summary, that analysis concluded that the cumulative effects of all of the relevant projects proposed or approved for the Guadalupe River would result in less than significant cumulative impacts for all resource topics, including the following resource categories:

- hydrology and hydraulics,
- water quality,
- vegetation,
- wildlife,
- fish,
- land use and planning,
- recreation, public access, and visual resources,
- transportation and traffic,
- air quality,
- noise,
- hazards and hazardous materials, and
- cultural resources.

The proposed Guadalupe Creek Restoration Project would not substantially contribute to cumulative habitat related impacts within the watershed. All of the impacts associated with the project are minor and temporary, and the purpose and long term objective of the project is to substantially increase habitat values along Guadalupe Creek. The few adverse effects of the Guadalupe Creek Restoration Project are temporary or very minor.

Recently, the District and the Corps have become aware of the presence of relatively high levels of mercury in the Guadalupe River watershed. Most of this mercury is derived from Gold-Rush-era mines in the upper watershed and is attached to sediments and particulates in the river channel. The presence of mercury in the watershed has raised numerous concerns regarding the ultimate fate of mercury from the watershed and its effect on ecosystem health under current conditions. Although the Guadalupe Creek Restoration Project may result in minor and very localized changes in sediment deposition and erosion, as well as changes in vegetation types in the project area that could affect the availability of mercury to living organisms, the proposed project is not expected to contribute substantially, or result in major changes, to either the conveyance of mercury through the watershed to San Francisco Bay or to the exposure of organisms to elevated levels of mercury within the watershed.

However, the District and the Corps recognize that the presence of relatively high concentrations of mercury in the watershed is an important existing issue requiring full public disclosure. Therefore, the following sections discuss these issues and provide information regarding actions being taken to address the presence of high levels of mercury in the watershed. It is important to note that based on available information, implementation of the various projects in the watershed are not expected to result in conditions that are substantially different from existing conditions.

5.1.3.1 Mercury Levels

As discussed above, the RWQCB recently prepared a draft TMDL program for mercury for San Francisco Bay (San Francisco Bay Regional Water Quality Control Board 2000). The program calls for a significant reduction in the transport of mercury to the bay from the Guadalupe River system. The RWQCB has determined that if the mercury load in the rivers could be reduced to pre-Gold Rush era levels, there would be a high probability that standards for mercury in the bay would be achieved.

Most of the mercury in the Guadalupe River watershed is attached to sediments and particulates. The sediments that are of greatest concern for mercury contamination are those that were transported and deposited along the banks of the Guadalupe River during the Gold Rush when mercury-bearing ore was mined in the upper watershed.

Mercury concentrations in sediments from different areas of the Guadalupe River watershed can vary widely. The potential for adverse environmental effects from sediment-bound mercury in the watershed will depend primarily on the source, transport and deposition characteristics and the physical and chemical properties of the sediment, as well as the solubility of mercury in the water column. A primary environmental concern is the potential for mercury in the aquatic environment to transform to dissolved forms that can be taken up by aquatic organisms, causing toxic reactions.

The greatest concern with regard to the accumulation of mercury-laden sediments in the watershed is the potential for sediment-bound mercury to transform to dissolved and methylated forms that can be readily adsorbed by aquatic organisms. The methylation process is dependent on environmental conditions, such as pH, dissolved organic carbon, temperature, sulfates, and light. Many of these physical and chemical factors are affected by biological processes, such as growth, decay, and other metabolic processes. Since most methylation is affected by biological processes, it is likely that the rate and quantity of methyl mercury formation changes seasonally.

Controlling sediment in the river is crucial for compliance with the reduction in mercury levels recommended in the TMDL program. Consequently, potential changes in the sources of sediment and sediment transport characteristics in the Guadalupe River system caused by construction and operation of flood protection projects and other construction projects in the watershed are analyzed in this cumulative impact analysis. The operation of the proposed flood protection projects and the Guadalupe Creek Restoration Project would not change the amount or rate of sediments entering the Guadalupe River from sources such as surface runoff and storm drains. The volume of mercury-bearing sediments entering the Guadalupe River from the abandoned mines and other sites in the watershed upstream from the confluence of Guadalupe Creek and Alamitos Creek would not be affected by the Guadalupe Creek Restoration Project, the proposed flood protection projects, or other projects in the Guadalupe River watershed.

Operation of flood protection projects on the Guadalupe River would cause local changes in the patterns of erosion and deposition of sediments already in the riverbank soils. Some of the sediments that would be affected by changes in erosion and deposition patterns may contain unacceptable levels of mercury. Mercury-bearing sediments could be transported in either the suspended wash load or the bedload. However, net erosion caused by peak flow conveyance in the Guadalupe River system is expected to be reduced by implementing the Guadalupe Creek Restoration Project and the proposed flood protection projects, including invert stabilization structures, bypasses, channel bed and bank armoring, additional vegetative bank cover, and bank management.

An erosion and sediment control plan will be implemented for the Guadalupe Creek Restoration Project to avoid discharges of sediment into the river during construction activities. In addition, a Soil Management Plan (SMP) will be implemented for the Guadalupe Creek Restoration Project that provides procedures for classification of soils, and procedures and criteria for disposal and reuse. The erosion and sediment control plan includes the requirements that contractors:

- conduct all construction work in accordance with site-specific construction plans that minimize the potential for sediment input to the stream;
- grade spoil sites to minimize surface erosion and apply erosion control measures as appropriate to prevent sediment from entering water courses or the stream channel, to the extent feasible; and
- avoid operating equipment in flowing water by diverting channel flow around the channel and bank construction area.

The SMP consists of the following components.

- Sediments with mercury concentrations that exceed hazardous waste criteria under federal or state law must be disposed of offsite in appropriately licensed disposal sites. The determination of hazardous properties shall comply with all applicable statutes and regulations pertaining to hazardous wastes.
- Excavated soils with mercury concentrations not exceeding hazardous waste criteria but greater than 1 part per million (ppm) may not be reused onsite unless such sediments are placed above the low-flow channel or in adjacent areas where frequent exposure to overbank flow is not anticipated to occur (i.e., above the water surface elevation defined by the 3-year recurrence interval[1], or as backfill away from the channel).
- Excavated surfaces above the elevation of the 3-year recurrence interval that contain mercury concentrations exceeding hazardous waste levels will be overexcavated and replaced with soils meeting the above criteria for onsite reuse. Excavated surfaces below the elevation of the 3-year recurrence interval that contain mercury concentrations greater than 1 ppm will be overexcavated and replaced with clean imported soil.

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[1] I.e., the elevation to which waters of the 3-year flood (the flood that can be expected to occur every 3 years on average) are expected to rise.

The Upper and Lower Guadalupe River Projects and the Downtown Project also include erosion and sediment control plans and soil management plans that are similar to those described above. The implementation of erosion and sediment control plans and soil management plans for the flood protection projects on the Guadalupe River will reduce the impacts of the potential discharge of sediment-bound mercury during construction activities to a less-than-significant level.

In addition, as part of its ongoing maintenance activities, the District will periodically remove bedload sediment that accumulates in the channel between Trimble Road and Montague Expressway. Sediment presently accumulates in this area and will continue to accumulate in this area whether or not the proposed project is constructed. Sedimentation studies for the Guadalupe River indicate that more than 90% of the bedload will continue to be deposited in the reach between Trimble Road and Montague Expressway when all flood protection projects are operational. This measure is anticipated to be necessary to maintain channel capacity for conveying flood waters. Removal of sediment that contains excessive levels of mercury would be considered beneficial to the overall goal of the RWQCB's TMDL program for mercury, which is to reduce mercury contamination in the watershed.

The potential for conversion of bound mercury into soluble methyl-mercury exists in any wetland or shallow sediment deposit and is currently occurring at unknown rates and locations. Because projects in the Guadalupe River watershed may slightly alter patterns of erosion and sediment deposition, these projects also have the potential to cause a change in the future distribution of methyl mercury. However, almost no information exists on the existing transport of bound mercury, the existing locations of mercury deposition, or the existing rate of methyl mercury formation in the Guadalupe River. What is known is that the Guadalupe Creek Restoration Project and the proposed flood protection projects on the Guadalupe River are expected to have the following results:

- the projects would not change the amount or rate of sediments entering the Guadalupe River from sources such as surface runoff and storm drains;
- net erosion caused by peak flow conveyance in the Guadalupe River system is expected to be reduced by implementing the projects; and
- the overall rate of erosion and sediment deposition, on a watershed scale, is not expected to change with the implementation of the projects and may be reduced.

Even with the benefits of the projects outlined above, mercury and the potential for methylation in the Guadalupe River watershed is an ongoing regional issue of concern. Leaching of mine tailings and overland flow of mercury-rich soils have resulted in the downstream accumulation of mercury in the Guadalupe River watershed. As a result of this past mining activity, tributaries of the Guadalupe River, including Guadalupe Creek and Alamitos Creek, as well as the Guadalupe River itself, have been contaminated with mercury. This regional issue constitutes an ongoing significant cumulative impact under CEQA and NEPA.

For the reasons stated in Chapter 4, the proposed project will not make a cumulatively considerable contribution to this cumulative impact, and additional mitigation is not necessary to reduce impacts associated with the proposed project. However, the District will implement the following mitigation measures to avoid and minimize ongoing cumulative impacts from disturbance and transport of methyl mercury in the watershed.

5.1.3.1.1 Assess Mercury Transport and the Potential for Methylation in the Guadalupe River Watershed. The District will participate with the RWQCB and other appropriate entities in assessing mercury transport in the Guadalupe River and the potential for methylation associated with any wetland and riparian mitigation on the District's lands. The District will coordinate with the San Francisco Bay RWQCB regarding monitoring methods for the proposed monitoring program. The District's participation will include continuous monitoring of flow and will also include monitoring of total suspended solids and total and bioavailable mercury. Methyl mercury concentrations in channel bed sediments of the Guadalupe River will also be monitored. Monitoring of methyl mercury concentrations will be conducted in freshwater, seasonal wetland, and riparian environments at sites approved by the RWQCB. This monitoring will be conducted for a minimum of 1 year on the Guadalupe River and 5 years on Guadalupe Creek. The data collected from the monitoring will be used by the District and the RWQCB to develop BMPs to minimize methylation and the overall transport of mercury-laden sediments to San Francisco Bay.

Although this monitoring would assist in the RWQCB's efforts to minimize and manage the adverse effects of mercury in Guadalupe River sediments, the most effective way to reduce the amount of mercury in the Guadalupe River is to control its discharge to the river from its sources in the upper watershed. Such actions are beyond the authority and jurisdiction of the District. Ultimately, regional implementation of the TMDL program will be necessary to solve the regional mercury contamination problem.

5.1.3.1.2 Develop and Implement the TMDL or Similar Program for Mercury for San Francisco Bay. The RWQCB is developing a TMDL program for mercury for the San Francisco Bay and has the responsibility and jurisdiction to implement the TMDL. The TMDL program proposes a significant reduction in the transport of mercury to the San Francisco Bay from the Guadalupe River system. The goal of the TMDL program for mercury in the San Francisco Bay region is to reduce sediment concentrations to less than 0.4 mg/kg. The TMDL program will identify involved parties and their proportional responsibility for the reduction of mercury in the Guadalupe River watershed and the San Francisco Bay. The District will participate in the TMDL program.

5.2 OTHER REQUIRED ANALYSES

5.2.1 Relationship between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

This analysis is intended to evaluate the potential for short-term benefits at the expense of long-term productivity. Instead, the proposed project would result in short-term impacts during the construction phase in exchange for long-term environmental benefits and productivity during the implementation phase. There would be temporary impacts from construction-related activities that disturb the riparian vegetation and SRA cover vegetation, thereby narrowing the range of beneficial uses of the environment. In the long term, planting to recreate these habitat types will offset the loss of riparian vegetation and SRA cover vegetation and enhance the long-term productivity of Guadalupe Creek. Other short-term environmental impacts associated with construction activities, such as reduced air quality and increased noise and traffic, would occur only during the construction phase of the proposed project and would not affect the long-term productivity of the environment.

Alternatives 1 and 2 would result in impacts similar to those of the proposed action. However, the temporary short-term construction impacts would be less than those of the proposed project because the alternatives involve less channel and vegetation disturbance. Alternative 2 results in less disturbance than Alternative 1. The long-term enhancement and productivity under these alternatives also would be respectively less than under the proposed project.

Alternative 3 (No Project) would not result in these short-term effects, but it also would not result in the enhancement and long-term productivity that restoring the project area would accomplish.

5.2.2 Irreversible or Irretrievable Commitments of Resources

The proposed project would result in the irretrievable commitment of fossil fuels and other energy resources for excavation and construction materials. The construction of the proposed project is not considered an irreversible or irretrievable commitment of resources because the amount of resources required is relatively minimal, and the proposed project will enhance the ability of an existing stream channel to support all life stages of steelhead and chinook salmon and to convey floodflows.

Compared to the proposed project, Alternatives 1 and 2 would result in similar but lesser impacts because less construction activity would be required. Alternative 3 (the No-Project Alternative) would not result in the commitment of resources because no construction would be involved.

5.2.3 Growth-Inducing Impacts

A project is considered growth-inducing if it directly or indirectly fosters economic or population growth or the construction of additional housing, removes obstacles to population growth, or encourages other activities that cause significant environmental effects (CEQA Guidelines sec 151262[d]). The proposed project and alternatives do not include any features that would remove an obstacle to or induce growth of the population. The areas of the City adjacent to Guadalupe Creek are almost completely developed, and there is little remaining vacant land. The project does not require developing or expanding any facilities that would promote growth.

5.2.4 Identification of the Environmentally Superior Alternative

Pursuant to the requirements of CEQA and NEPA, the Channel and Floodplain Modification Alternative (proposed project) has been identified as the environmentally superior/environmentally preferable alternative. The environmentally superior/environmentally preferable alternative is the alternative that will result in the least damage to the biological and physical environment and the alternative that will protect, preserve, and enhance historic, cultural, and natural resources while accomplishing the project's objectives. Implementation of the Floodplain and Channel Modification Alternative would meet the primary objective of restoring SRA cover vegetation and improving aquatic habitat for anadromous fish, and would result in a substantial increase in biological resources in the project area. The net benefits to the environment associated with the proposed project—the establishment of 6 acres of riparian vegetation and approximately 13,000 linear feet of SRA cover vegetation—are much greater than those associated with Alternatives 1 and 2. The proposed project also meets the secondary objectives of creating riparian habitat, enhancing aquatic habitat, and restoring natural ecological and physical processes while maintaining existing flood conveyance capacity and minimizing impacts on existing resources. Although implementation of the proposed project would have slightly greater impacts on existing vegetation than the other alternatives, these impacts are relatively minor in comparison with proposed project's expected net benefits to the environment. In addition, features associated with the proposed project (e.g., extensive floodplain excavation) may improve existing mercury-related site conditions (e.g., transport of mercury-bearing sediments, formation of methyl mercury, and mercury bioaccumulation), resulting in a greater net benefit to aquatic habitat and water quality than the other alternatives. Although the No-Project Alternative would result in fewer direct environmental impacts than the proposed project, it would not meet project objectives, nor would it improve water temperatures or provide habitat for anadromous fish species. The selection of the Floodplain and Channel Modification Alternative as the environmentally superior alternative is based on the conclusions of the impact analysis presented in Chapters 4 and 5 of this EIR/EIS. The proposed project also meets the requirements stipulated under CWA Section 230.10(a) for the "least environmentally damaging" alternative.

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Pearl Avenue Library
Attn: Languages Department
4270 Pearl Avenue
San Jose, CA 95136

Rosegarden Library
Attn: Languages Department
1580 Naglee Avenue
San Jose, CA 95126

San Jose State University
Attn: James Schmidt, University Librarian
One Washington Square
San Jose, CA 95192-0028

San Jose City College
2100 Moorpark Avenue
San Jose, CA 95128-2799

San Jose Dr. Martin Luther King, Jr. Main Library
Attn: Reference Dept., David Kravitz
180 West San Carlos Street
San Jose, CA 95113

Willow Glen Library
Attn: Languages Department
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6.4 OTHER INTERESTED PERSONS

All individuals on the Guadalupe Creek Restoration Project mailing list will be notified of the availability of this report.

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8.2 PERSONAL COMMUNICATIONS

Abeyta, Daniel. Acting State Historic Preservation Officer. Letter (re: NHPA Section 106 consultation, Guadalupe Creek Restoration Project, City of San Jose, Santa Clara County, California)—July 24, 2000.

Aguilera, Joe. Management Analyst II. Santa Clara Valley Water District. Conversation—March 2000.

Martin, Barbara. Terminal Operator. City of San Jose Department of Public Works. Telephone conversations—February 29, 2000, and July 6, 2000.

Martinez, Margaret. Administrative Services. San Jose Police Department. Personal communication—February 23, 2000.

Scully, Tom. Public Information Officer. San Jose Fire Department. Personal communication—February 23, 2000.

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Mitigation and Monitoring Plan
Guadalupe Creek Restoration Project from Almaden Expressway to Masson Dam

Mitigation Measure As Contained in the Draft EIR/EIS	Implementation, Monitoring, and Enforcement Responsibility	Timing of Implementation	Monitoring and Enforcement
Biological Resources			
1. **Compensation for loss of wildlife habitat because of tree removal**—To compensate for the loss of nesting habitat, the District will be responsible for installing nesting and roosting boxes for birds and bats onsite at a ratio based on the size of the removed tree (i.e., one box per 12 inches dbh) before the first breeding season after construction begins. A qualified wildlife biologist will determine the design and locations of the boxes. Furthermore, the biologist and appropriate District staff members will conduct a site visit within 1 week after the boxes are installed to confirm that the boxes have been properly installed and located. If the biologist determines that any of the boxes are improperly located or constructed, the District will immediately arrange for reinstallation of the boxes. A qualified wildlife biologist will also monitor the boxes on a monthly basis from April to June and evict any non-native species.	Santa Clara Valley Water District and a qualified wildlife biologist	Nesting boxes will be installed during project construction.	The design, location, and installation of the boxes will be approved by a qualified wildlife biologist. The District will be responsible for maintenance of the boxes. For the 5-year period following completion of the project, if District staff determine during routine maintenance activities that any of the boxes are damaged or destroyed, the District will immediately repair or replace the boxes. The District will also be required to monitor the nest boxes once a month during the nesting period (late April–early July) for 5 years following project completion. Visual observations with binoculars or a spotting scope will be used to determine whether the boxes are being used by the targeted species. Successful nesting boxes will be recorded; if possible, the number of broods per box will also be recorded. This information will be retained by the District for future use. If individuals of nontarget introduced species (e.g., European starling, house sparrow) are occupying the boxes, District biologists will enter the nesting boxes and remove the birds and their eggs.

Mitigation Measure As Contained in the Draft EIR/EIS	Implementation, Monitoring, and Enforcement Responsibility	Timing of Implementation	Monitoring and Enforcement
2. Compensation for loss of sycamore alluvial woodland—Mature trees removed as a result of the proposed project will be replaced onsite and will be mitigated with compensation planting at a ratio of 3:1 based on area of existing canopy cover. For example, the loss of 1 square foot of canopy cover will be replaced by planting an area equal to 3 square feet. Replacement of mature trees will occur at the same time as project construction. Mitigation plantings will consist of in-kind species (oak, elderberry, and sycamore) from locally native genetic stock. In addition, removed trees will be left on the project site, where they will provide instream aquatic habitat for anadromous fish or upland cover for wildlife, depending on placement.	Santa Clara Valley Water District	Replacement trees will be planted during project construction.	Once the trees are planted, a District biologist will be required to conduct site surveys of the trees 4 times per year for 3 years. A report detailing survey findings will be provided to the Guadalupe Creek maintenance supervisor after every survey. If any trees are found to be dead, the District will replace them within 1 year.
3. Compensation for loss of Phase 1 plantings as a result of construction—Phase 1 plantings located in construction areas will be removed before construction activities begin and will be replanted in the Phase 1 mitigation area during the planting phase of the proposed project. Any Phase 1 plantings adversely affected during transplanting activities as a result of the proposed project will be replaced onsite at a 1:1 ratio. Replacement plantings will consist of in-kind species from locally native genetic stock. Preventive measures to protect vegetation during construction (see *Vegetation Management Measures* in the *Best Management Practices* section of Chapter 2) will be implemented to safeguard remaining Phase 1 plantings.	Santa Clara Valley Water District	Replanting and replacement of Phase 1 plantings will occur during the planting phase of the project.	Project drawings and specifications will allow the District to determine exactly which plants need to be removed. Based on the drawings and specifications, a qualified District biologist will oversee removal of all Phase 1 plantings. In addition, this biologist will oversee storage, daily care, and replanting of the Phase 1 plantings throughout the construction period. Furthermore, District staff will monitor construction activities within Reach 4 daily to ensure that vegetation protection measures are properly implemented to ensure the safety of remaining Phase 1 plantings.

Mitigation Measure As Contained in the Draft EIR/EIS	Implementation, Monitoring, and Enforcement Responsibility	Timing of Implementation	Monitoring and Enforcement
Hydrology and Water Quality			
1. **Compensation for potential increase in formation of methyl mercury in the project reaches of Guadalupe Creek**—In conjunction with the Corps, the RWQCB, and other resource and regulatory agencies, the District will be required to develop and implement a program to monitor postproject changes in observed methyl mercury concentrations. Additional baseline monitoring will be implemented before construction at existing sampling locations within and upstream of the project reach; the same sites will be used for preconstruction and postconstruction monitoring. Monitoring will continue for a minimum of 5 years. Measurements will be taken weekly for 4 weeks after reintroduction of streamflow; after this 4-week period, measurements will be taken quarterly, and will include measurements immediately before and after two storm events. The water samples will be analyzed for total mercury, dissolved mercury, and unfiltered and filtered methyl mercury as well as suspended solids, pH, temperature, dissolved oxygen, and dissolved organic carbon. Samples will be taken at mid-depth, except in pools, where top and bottom samples will be collected. If large changes in water turbidity are evident, samples of suspended solids will be taken and pH and temperature will be measured to characterize the full depth cross section of the creek. A comparison of data on water samples collected from the upstream sites and from the project reaches of the creek will show whether postconstruction levels of unfiltered and filtered methyl mercury in the project area are increased above baseline concentrations and are	Santa Clara Valley Water District, Corps, and RWQCB	Monitoring program will be developed prior to project construction. Implementation will follow the timeline described in the mitigation measure.	The District and the RWQCB will ensure that the monitoring program is developed and implemented. Monitoring will continue for a minimum of 5 years. If necessary, the District will develop and implement additional mitigation measures.

Mitigation Measure As Contained in the Draft EIR/EIS	Implementation, Monitoring, and Enforcement Responsibility	Timing of Implementation	Monitoring and Enforcement
substantially increased above upstream concentrations (i.e., increased by a factor of 2 or more). No further investigation will be conducted unless both these conditions are met. If monitoring shows elevated methyl mercury levels, concentrations in the creek will be measured to assess whether increased methyl mercury levels are related to differences in the parameters analyzed. If so, sediment and porewater samples will also be collected and analyzed for methyl mercury, total mercury, sulfide, pH, total organic carbon, and sulfate. A survey of conditions in stream reaches showing elevated mercury levels will be conducted to identify areas where methylation may be occurring. In addition, if monitoring shows substantial increases in levels of methyl mercury in the project reaches, the District will collaborate with the Corps, the RWQCB, and other resource and regulatory agencies to identify and implement additional measures to reduce methyl mercury levels in the project area. These measures may include, but are not limited to: (1) backfilling deep pools with rock or other materials to decrease depth, limit stagnation, and/or ensure oxygenation throughout the full depth of the pool; (2) installing additional bank stabilization and/or erosion control features to reduce localized erosion and inchannel deposition; and (3) installing additional instream habitat features to further reduce the width of the low-flow channel in order to concentrate flow, reduce stagnancy, and ameliorate anoxic conditions. Additional monitoring will be implemented to assess the effectiveness of these preventive measures.			

Mitigation Measure As Contained in the Draft EIR/EIS	Implementation, Monitoring, and Enforcement Responsibility	Timing of Implementation	Monitoring and Enforcement
Hazards and Hazardous Materials			
1. **Compensation for potential hazards to human health associated with exposure of newly excavated bank materials with elevated mercury concentrations**—In conjunction with the RWQCB and the Department of Toxic Substance Control (DTSC), the District will develop and implement a program to test soils exposed by excavation or grading or otherwise disturbed by project construction to determine mercury concentrations in the exposed surfaces. Soils with mercury concentrations exceeding 20 mg/kg will be removed and disposed of in a Class I landfill.	Santa Clara Valley Water District and RWQCB	Testing, and removal and disposal of spoils qualifying as hazardous materials, will occur during project construction.	The testing program will be developed by the District, in collaboration with the DTSC and the RWQCB. It will be implemented by qualified District personnel or an appropriate contracted firm. Offhauling and disposal of spoils will be carried out by a licensed hazardous materials contractor.
2. **Compensation for potential to encounter non-mercury hazards or hazardous materials during excavation of streambed and bank materials**—In the event that hazards or hazardous materials other than mercury-contaminated soils, sediments, or waters are encountered during construction, all construction activities in the area of the uncovered site will stop and the District will implement the following measures. (1) *The District will conduct Level I, Level II, and (if* required) Level III hazardous materials investigations to identify and delineate the extent of hazardous material contamination within the uncovered area and evaluate potential impacts on project construction. (2) The District will verify that all hazardous waste materials removed during construction are handled and disposed of by a licensed waste-disposal contractor and transported by a licensed hauler to an appropriately licensed and permitted disposal or recycling facility, in accordance with federal, state, and local requirements.	Santa Clara Valley Water District	All mitigation actions will occur during project construction.	If non-mercury hazards or hazardous materials are encountered during construction, all construction activities in the area of the uncovered site will stop, and the District will implement appropriate measures in accordance with all applicable federal, state, and local requirements

Mitigation Measure As Contained in the *Draft EIR/EIS*	Implementation, Monitoring, and Enforcement *Responsibility*	Timing of *Implementation*	*Monitoring and Enforcement*
Socioeconomics and Environmental Justice			
1. **Compensation for continued health risk associated with consumption of fish (Environmental Justice)**—The District will install warning signs at 100-foot intervals on both sides of the creek along the entire project reach, beginning at the entrance to the creek at Almaden Expressway. The signs will state that fish in the area are contaminated and will list the health risks associated with consumption of the fish. In addition, the signs will include the telephone number of the Santa Clara County Department of Health Services so that the public can contact the Department if necessary. Each sign will be written in English, Spanish, and Vietnamese in order to address the area's diverse population. The District will coordinate with the Santa Clara County Department of Health Services to determine the exact wording for the signs. If District staff discover during routine maintenance activities that any signs are missing, missing signs will be reported and replaced immediately.	Santa Clara Valley Water District	Signs will be posted during project construction.	The signs will not be directly monitored. However, the District will be responsible for replacing signs that are reported missing by District staff during routine maintenance activities. In addition, the District will be required to immediately replace signs reported by the public as missing.

Glossary[1]

ambient—Existing or background. E.g., *ambient conditions.* Commonly used to describe existing air, soil, water, or habitat conditions in a given area.

anadromous—Refers to migratory fishes, such as steelhead and chinook salmon, that hatch in rivers or streams, spend their adult lives in the ocean, and return to their natal stream to breed in fresh water.

banks—The slopes of an active channel, between which streamflow is normally confined.

bank erosion—Removal of sediment and soil particles from a bank slope, primarily by the action of running water. Climate, ice and debris, chemical reactions, and changes in land and stream use may also contribute to bank erosion.

bank stabilization structures—features installed or constructed to reduce bank erosion.

bar—A deposit of sediment (boulders, gravel, sand, and mud) on the bed of a stream, typically formed and modified at high flow and exposed at low water.

bed—The floor of a streamchannel or other body of water.

Best Management Practices (BMPs)—Practices implemented to prevent or reduce potential impacts common to construction. BMPs may include operations and maintenance procedures, construction-site housekeeping requirements, schedules of activities, and prohibition of certain practices.

California Environmental Quality Act (CEQA)— State legislation that established environmental policy for California. CEQA provides an interdisciplinary framework for state agencies to prevent environmental damage by ensuring that decision makers take environmental factors into account when approving projects.

channel—A natural or artificial feature that conveys water.

channel relocation—Excavation and grading to move the active channel of a stream to another location.

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[1] Sources consulted in the preparation of this Glossary include Jackson 1997, Jones and Stokes 2000c, and U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000.

chinook salmon—*Oncorhynchus tshawytscha*, the largest species of the salmon family. Inhabits the northwest Pacific Ocean and spawns in rivers and streams of North America. Chinook salmon are differentiated based on the season in which they migrate into rivers to spawn (e.g., winter run, spring run, fall run).

Clean Water Act—Formally known as the Federal Water Pollution Control Act; the basic water pollution control statute for the United States.

coffer dam—Temporary structure that isolates a portion of a streamchannel from flow so that it can be pumped dry (dewatered), permitting inchannel construction.

cooperating agency—Under NEPA, a federal agency besides the lead agency that has legal jurisdiction over a proposed action (project) or that has expertise relevant to assessing its impacts.

cultural resources—General term referring to buildings, sites, districts, structures, objects, or other materials or features significant to history, architecture, archaeology, culture, or paleontology.

cumulative impact—The effect of two or more individual impacts that, when considered together, are considerable, or that compound or increase other environmental impacts. The individual impacts may be changes resulting from a single project or from two or more separate projects.

direct impact—Primary environmental effect resulting from construction or operation of a project and occurring at the same time and place.

ecosystem—A recognizable, relatively homogeneous unit that includes organisms and their environment as well as the interactions among organisms, and between organisms and environment.

Endangered Species Act of 1973—Federal law that protects plant and animal species in danger of extinction.

environmental assessment (EA)—A public document prepared in compliance with the National Environmental Policy Act to evaluate the significance of the impacts likely to result from a proposed action (project) and to determine whether an environmental impact study (EIS) is required.

environmental compliance—The process necessary to comply with federal, state, and local environmental laws and regulations.

environmental impact report (EIR)—A detailed written statement prepared in compliance with the California Environmental Quality Act, describing and analyzing the environmental impacts of a proposed project, and discussing ways to mitigate or avoid those impacts.

environmental impact statement (EIS)—A detailed written statement, prepared in compliance with Section 102(2)(c) of the National Environmental Policy Act, describing and analyzing the environmental impacts of a proposed action (project), and discussing ways to mitigate or avoid those impacts.

erosion—Strictly speaking, refers to the removal of sediment, soil, or other surface material from a landscape surface (e.g., hillside, streambank, or streambed) by the scouring action of turbulent water. Sometimes used informally to refer to the collective action of water, wind, and ice to "wear away" a landscape over time.

exotic species—A species of plant, fish, or wildlife that is not native to the area where it is found. In the San Francisco Bay Area many plant species that were originally introduced for ornamental or agricultural purposes have become naturalized in local environments. Examples include: English ivy (*Hedera helix*) (a common "escaped ornamental" species); a variety of fruit and nut trees including apples, plums, cherries, almonds and walnuts (imported for orchard cultivation); and a number of kinds of eucalyptus (*Eucalyptus* spp.) (imported to create windbreaks). Other exotic species that are now common constituents of the California landscape were accidental imports carried by settlers or their livestock; this is the case with the exotic annual grasses that are now the primary component of grassland environments in much of the Bay Area. Exotic wildlife in the Bay Area includes the Virginia opossum (*Didelphis virginiana*), the red fox (*Vulpes vulpes*), and the house mouse (*Mus musculus*).

FIRM map—Flood Insurance Rate Map. Map used to establish insurance rate structures under the National Flood Insurance Program, on the basis of historical data on flood magnitudes and recurrence frequencies.

flood conveyance capacity—The ability of a channel to carry or move floodwaters.

floodplain—Land adjacent to a streamchannel, at or above the elevation of bankfull discharge. The floodplain typically consists of a flight of several benches or terraces with progressively higher elevations flanking the active channel. Benches at lower elevations are typically inundated about 2 out of 3 years on average; higher-level benches are inundated only in larger flood events that recur on a longer cycle (10–100 years). The floodplain develops as sediment is deposited by waning floodwaters.

floodplain development—Natural processes of flooding and sediment deposition that contribute to the growth of the floodplain.

geomorphology—The branch of earth sciences that deals with the shape and development of landforms.

groundwater—Water in subsurface soil and rock materials, from which wells are supplied. In unconsolidated or loosely consolidated materials (such as soil or porous sedimentary rocks), groundwater occupies spaces between grains. In hard, consolidated materials (such as granite, metamorphic rocks, or "tight" sedimentary rocks), groundwater occupies fractures or cracks.

habitat—The environmental context in which an animal or plant normally lives, among its associated species.

hazardous materials—Raw materials and products that (because of their quantity, concentration, or physical or chemical characteristics) pose a significant present or potential danger to human health and safety or to the environment if released.

hydraulics—The engineering subdiscipline that addresses the flow of water and other fluids, including the practical effects and control of moving water. Also refers to the relationship between channel geometry, flow velocity, and depth of water in a natural or artificial channel.

impact—A change in environmental conditions that results from implementing or operating a project (CEQA) or action (NEPA).

inchannel—Instream; within the channel or wetted portion of a streambed.

incision—The erosive process by which water cuts a channel or erodes a bank; the process of eroding or downcutting to a lower level.

indirect impact—Secondary environmental effect resulting from construction or operation of a project; removed in time or space from the project (cf. **direct impact**).

infiltration—Movement of rainwater or surface runoff downward into subsurface soil, sediments, and rock. Infiltration is typically a major source of groundwater recharge in areas with permeable surface materials.

initial study (IS)—A public document prepared in compliance with the California Environmental Quality Act to evaluate the significance of the impacts likely to result from a proposed project and to determine whether an environmental impact report (EIR) is required.

instream—Inchannel; within the channel or wetted portion of a streambed.

invertebrates—Organisms that lack a spinal column.

jurisdictional wetlands—Areas "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3, 40 CFR 230.3). Jurisdictional wetlands are considered waters of the United States under the federal Clean Water Act.

lead agency—The public agency that has the principal responsibility for carrying out or approving a proposed project.

levee—A natural or artificial embankment along a river. The term levee is generally applied when the riverbank rises above the level of the adjacent floodplain. Some natural streams, especially those with low gradients and meandering channels, have naturally aggraded levees. In some places, such as the Sacramento River delta region, levees are built up artificially as a means of enhancing flood protection.

low-flow channel—A narrow channel within a streambed that confines streamflow during periods of low water volume, reducing water stagnation at low flow and thus decreasing channel siltation and improving both water quality and habitat values. A constructed low-flow channel is roughly analogous to the thalweg, or deepest portion, of a natural stream channel.

maintenance—The activities necessary to ensure that the elements of a project continue to operate properly after construction. In the habitat restoration context, includes activities that ensure the successful establishment of restoration plantings, including but not necessarily limited to weeding, thinning, irrigation, and exotic species control.

meander—A curve or bend in a stream channel, characterized by erosion on the outer bank and deposition on the inner bank. Strongly meandering channels are characteristic of low-gradient streams.

mitigate—To moderate, reduce, or alleviate the impacts of a proposed activity. May include: (a) avoiding the impact by not taking a certain action or parts of an action; (b) minimizing the impact by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and/or (e) compensating for the impact by replacing or providing substitute resources or environments.

mitigation—Refers to the act of mitigating, or to measures or features designed to mitigate.

National Environmental Policy Act (NEPA)—Federal legislation that established environmental policy for the nation. NEPA provides an interdisciplinary framework for federal agencies to prevent environmental damage and contains "action-forcing" procedures to ensure that federal agency decision makers take environmental factors into account.

National Register of Historic Places (NRHP)—A register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture. Maintained by the Secretary of the Interior.

natural recruitment—The proliferation of a plant species by natural means.

non-native species—Exotic species; plant, fish, or wildlife species introduced to an area from elsewhere, often resulting in destructive consequences for native species.

notice of intent (NOI)—A notice published in the Federal Register stating that a lead agency is planning to prepare an environmental impact statement.

notice of preparation (NOP)—A notice sent to responsible, trustee, and involved federal agencies, and filed with the State Clearinghouse, stating that a lead agency plans to prepare an environmental impact report.

100-year flood—A flood that has a 1% chance of being equaled or exceeded in any given year.

peak flow—The maximum discharge (flow volume) of a stream during a specified period of time.

percolation pond—A pond constructed for the purpose of returning water to an aquifer by infiltration. See **infiltration**.

plan view—Map view or "bird's-eye" view.

planform—The shape of some feature when viewed from above (in map view or plan view).

planting zone—The area designated for planting in a habitat restoration project. The15-foot planting zone refers to the area within 15 vertical feet of the active low-flow channel.

PM10 emissions—Emissions of inhalable particulate matter (suspended particulate matter less than 10 micrometers in diameter). PM10 emissions are generated by a wide variety of sources, including agricultural activities, industry, and vehicle traffic.

pool—A portion of a streamchannel where the water is comparatively deep and slow-moving. Pools are typically erosional features and, because they are deeper than adjacent channel reaches, may retain some water even if the rest of the channel is dry.

reach—A section, segment, or portion of a stream's length.

recharge—Replenishment of groundwater reserves, typically by infiltration, or percolation of surface water downward through permeable surface materials into the subsurface.

responsible agency—A public agency that proposes to carry out or approve a project for which a lead agency has prepared an environmental impact report.

riffle—A shallow rapid, usually located where the current crosses a meander in the active streamchannel.

riparian—Pertaining to the banks of a river, stream, waterway, or other flowing body of water, as well as to plant and animal communities along such bodies of water.

run—A channel segment characterized by uniform depth and comparatively swift streamflow with little or no surface turbulence and no major flow obstructions. Intermediate between a riffle and a pool; may be a flooded riffle. Similar to a riffle in habitat value. Equivalent to U.S. Forest Service usage of *glide*.

rootwad—A tree stump with roots installed in a streambank as part of a bank stabilization program, to constrain streamflow, and/or to provide improved fish habitat.

runoff—The portion of precipitation (rainfall or snowmelt) that remains on the ground surface and enters the surface water system rather than percolating into the subsurface.

salmonid—Any of a large family of fish including salmon, steelhead, and trout.

scour—The erosive action of turbulent running water.

sediment—Generally used to refer to particles physically broken down and transported from their source by the action of water, ice, or wind. Strictly defined, *sediment* also includes components dissolved from a parent rock source and carried in solution by surface water and groundwater.

sediment deposition—The accumulation of boulders, gravel, sand, and mud on the streambed, streambanks, and floodplain.

sediment load—The amount of material a stream is carrying at a given time.

sedimentation—The process by which sediments settle out of water.

shaded riverine aquatic (SRA)—Refers to emergent riparian vegetation that overhangs a streamchannel. One important function of SRA cover vegetation is to shade the water in the channel, helping to maintain cooler water temperatures, and thereby improving habitat for native coldwater fish such as steelhead and chinook salmon. SRA cover also provides a source of inchannel plant material, including leaf litter (used by shredding insect species) and woody material (an important source of cover for fish).

smolt—A young salmon or steelhead that has reached the developmental stage essential for migrating to the ocean.

spawn—To lay eggs (usually refers to fish).

spawning gravel—Streambed gravel used by fish as a place to lay eggs and fertilize them. Some species (for example, coldwater anadromous fishes such as steelhead and chinook salmon) require a specific size, depth, and extent of gravel in a streambed in order to spawn successfully. Spawning habitat is critical to the survival of fish species in an area.

streambank erosion—Removal of sediment and soil particles from a bank slope, primarily by the action of running water. Climate, ice and debris, chemical reactions, and changes in land and stream use may also contribute to bank erosion.

streambanks—The slopes of an active channel, between which streamflow is normally confined.

special-status species—Includes plant, fish, and wildlife species that are listed, proposed for listing, or candidates for listing as threatened or endangered under the federal or California Endangered Species Act; also include plant species that are listed by the California Native Plant Society.

spreader dam—A water storage structure that slows streamflow and promotes infiltration and groundwater recharge.

upland habitat—Habitat in areas not subject to flooding.

vegetated bar—A bar whose surface supports vegetation, which typically acts to protect the bar from erosion except at flood stage. See **bar**.

water table—An imaginary underground surface below which subsurface materials (soil, rock, etc.) are saturated (i.e., open spaces within materials are filled with water).

watershed—The area that drains or contributes surface water to a stream, lake, or other body of water.

weir—A dam, wall, or other structure in a waterway for the purpose of storing, diverting, screening, or measuring water.

wetland—Land transitional between terrestrial and aquatic regimes (e.g., marshes, intertidal mudflats, and wet meadows), where the water table is typically at or near the surface, or the ground is covered by shallow water. Wetlands include freshwater, brackish, and saltwater areas. See also **jurisdictional wetland**.

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List of Acronyms and Abbreviations

ABAG	*Association of Bay Area Governments*
ACHP	Advisory Council on Historic Preservation
BA	biological assessment
BAAQMD	Bay Area Air Quality Management District
BMPs	best management practices
CAA	Clean Air Act
CAAQS	California ambient air quality standards
Cal-EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CCR	California Code of Regulations
CDMG	California Department of Mines and Geology
CEQ	President's Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund Act)
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm	centimeter
CO	carbon monoxide
Corps	U.S. Army Corps of Engineers, Sacramento District
CRHR	California Register of Historical Resources
CWA	Clean Water Act
dBA	adjusted decibels
dbh	diameter at breast height
DFG	California Department of Fish and Game
District	Santa Clara Valley Water District
Downtown Project	Guadalupe River Flood Protection Project in downtown San Jose
EFH	essential fish habitat
EIR	environmental impact report
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FAHCE	Fisheries and Aquatic Habitat Collaborative Effort
fps	feet per second

General Plan	City of San Jose 2020 General Plan
GRR/EIR/SEIS	Draft General Re-Evaluation and Environmental Report for Proposed Project Modifications, Guadalupe River Project, Downtown San Jose
HEP	habitat evaluation procedures
HMIS	Hazardous Materials Inventory Statement
HMMP	Hazardous Materials Management Plan
HMSO	Hazardous Materials Handling and Storage Ordinance
HSWA	Hazardous and Solid Waste Amendments
HWCL	Hazardous Waste Control Law
IS/EA	initial study/environmental assessment
IWM	instream woody material
L_{dn}	day-night average sound level
lf	linear feet
LOECs	lowest observed effect concentrations
LOS	level of service
Lower Guadalupe River Project	Lower Guadalupe River Flood Protection Project
μ	micrometers
$\mu g/m^3$	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
mgd	million gallons per day
MMP	mitigation and monitoring plan
MOA	memorandum of agreement
mph	miles per hour
MRZ-3	Mineral Resource Zone 3
NAAQS	national ambient air quality standards
NDDB	DFG's Natural Diversity Data Base
NEPA	National Environmental Policy Act
NHI	National Heritage Institute
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOI	notice of intent
NOP	notice of preparation
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

PM10	inhalable particulate matter (particulate matter less than 10 microns in diameter)
PRG	preliminary remediation goal (defined by EPA)
proposed project	Phase 2 of the Guadalupe Creek Restoration Project
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
sf	square feet
SFBAAB	San Francisco Bay Area Air Basin
SHPO	state historic preservation officer
SIP	state implementation plan
SJFD	San Jose Fire Department
SJPD	San Jose Police Department
SO_2	sulfur dioxide
SRA	shaded riverine aquatic
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
the County	Santa Clara County
the City	City of San Jose
TMDL	total maximum daily load
TSS	total suspended solids
UBC	Uniform Building Code
Upper Guadalupe River Project	Upper Guadalupe River Flood Control Project
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VPD	vehicles per day
WPCP	Water Pollution Control Plant

Appendix A. Special-Status Species and Sensitive Natural Communities

A.1 SPECIAL-STATUS SPECIES AND SENSITIVE NATURAL COMMUNITIES

A.1.1 Definitions of Special-Status Species

Special-status species include plants and animals that are legally protected under the state or federal ESA or other regulations and species that are considered sufficiently rare by the scientific community to qualify for such listing. Special-status plants and animals are species in the following categories:

- species listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (50 CFR 17.12 [listed plants], 50 CFR 17.11 [listed animals], and various notices in the Federal Register (FR) [species proposed for listing]);
- species that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR 7596-7613, February 28, 1996);
- species listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 California Code of Regulations (CCR) 670.5);
- species that meet the definitions of *rare*, *threatened*, or *endangered* under CEQA (CEQA Guidelines, Section 15380);
- plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.);
- plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (Lists 1B and 2 in Skinner and Pavlik 1994);
- plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4 in Skinner and Pavlik 1994), which may be included as special-status species on the basis of local significance or recent biological information;
- animal species of special concern to the California Department of Fish and Game (Remsen 1978 [birds], Williams 1986 [mammals], and Jennings and Hayes 1994 [amphibians and reptiles]); and
- animals fully protected in California (California Fish and Game Code, Section 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).

A.1.2 Definition of Sensitive Natural Community

Sensitive natural communities are communities that are especially diverse, are regionally uncommon, or are of special concern to local, state and federal agencies. Elimination or substantial degradation of these communities would constitute a significant impact under CEQA. The riparian scrub and forest and sycamore alluvial woodland described in Chapter 3 of this document qualify as sensitive natural communities at the Guadalupe Creek Restoration Project site.

Table A-1. Special-Status Plant Species That Occur in Santa Clara County

Common and Scientific Name	Legal Status[a] Federal/State/CNPS	Geographic Distribution	Habitat	Blooming Period	Potential for Occurrence at Project Site
Robust spineflower *Chorizanthe robusta* var. *robusta*	E/–/1B	Central coast region of California (Alameda*, Monterey, San Francisco*, San Mateo*, Santa Clara*, and Santa Cruz Counties).	On sandy soil in coastal bluff scrub, coastal dunes, and openings in cismontane woodland.	May–Sep	None—no suitable habitat.
Mt. Hamilton thistle *Cirsium fontinale* var. *campylon*	SC/–/1B	Northern Diablo Range and eastern San Francisco Bay area, (Alameda and Santa Clara Counties); Stanislaus County.	Freshwater seeps and streams on serpentine outcrops. In chaparral, cismontane woodland, valley and foothill grassland at 1,000'–2,500'.	Apr–Oct	None—no suitable habitat.
Santa Clara red ribbons (South Bay clarkia) *Clarkia concinna* ssp. *automixa*	SC/–/1B	Eastern and southern San Francisco Bay foothills (Alameda and Santa Clara Counties).	Shaded mesic oak woodland below 5000'.	Apr–July	Low to very low.
Santa Clara Valley dudleya *Dudleya setchellii*	E/–/1B	Endemic to Santa Clara County.	Rocky serpentine outcrops and on rocks within grassland or woodland at 260'–1,100'	May–June	None—no suitable habitat.
Fragrant fritillary *Fritillaria liliacea*	SC/–/1B	California Coast Ranges from Marin County south to San Benito County.	Adobe soils of interior foothills, coastal prairie, coastal scrub, and annual grassland (commonly on serpentine) below 1,350'.	Feb–Apr	None—no suitable habitat.
Congdon's tarplant *Hemizonia parryi* ssp. *congdonii*	SC/–/1B	Eastern San Francisco Bay Area, Salinas Valley, Los Osos Valley.	Annual grassland (in some cases on alkaline or saline soils), on slopes, flats, and swales below 700'.	Jun–Nov	Very low—only marginally suitable habitat, not observed during field visits.
Smooth lessingia *Lessingia micradenia* var. *glabrata*	SC/–/1B	Endemic to Santa Clara County.	Serpentine chaparral, at 400'–1,380'; common along roadsides.	Aug–Nov	None—no suitable habitat.
Hall's bush mallow *Malacothamnus hallii*	–/–/1B	Alameda, Contra Costa, Merced, and Santa Clara Counties.	Chaparral between 30' and 2,500'.	May–Sep	None—no suitable habitat.
Santa Cruz Mountains beardtongue *Penstemon rattanii* var. *kleei*	–/–/1B	Santa Clara and Santa Cruz Counties.	Sandy or shaly slopes in chaparral, lower montane coniferous forest, North Coast coniferous forest at 1,300'–3,600'; in some cases, in the transition zone between forest and chaparral.	May–June	None—no suitable habitat.

Table A-1. Continued

Common and Scientific Name	Legal Status[a] Federal/State/CNPS	Geographic Distribution	Habitat	Blooming Period	Potential for Occurrence at Project Site
Hairless popcornflower *Plagiobothrys glaber*	–/–/1A	Historically known from coastal valleys from Marin County south to San Benito County.	Alkaline meadows, coastal salt marsh.	Apr–May	None—no suitable habitat.
Metcalf Canyon jewelflower *Streptanthus albidus* ssp. *albidus*	E/–/1B	Endemic to Santa Clara County.	Open areas in dry grassy meadows on serpentine soils; also on serpentine balds within grassland, 145'–800'.	Apr–July	None—no suitable habitat.
Most beautiful jewelflower *Streptanthus albidus* ssp. *peramoenus*	SC/–/1B	Alameda, Contra Costa, and Santa Clara Counties.	Chaparral and annual grassland on ridges and slopes with serpentinite outcrops, at 450'–3,200'	Apr–June	None—no suitable habitat.
Caper-fruited tropidocarpum *Tropidocarpum capparideum*	SC/–/1A	Historically known from the northwestern San Joaquin Valley and adjacent Coast Range foothills.	Grasslands in alkaline hills, below 1,500'.	Mar–Apr	None—no suitable habitat.

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[a]Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
PE = proposed for listing as endangered under the federal Endangered Species Act.
PT = proposed for listing as threatened under the federal Endangered Species Act.
C = candidate species (species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list).
SC = species of concern (species for which existing information may warrant listing but for which substantial biological information to support a proposed rule is lacking).
– = no listing.

Table A-1. Continued

State

E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
R = listed as rare under the California Native Plant Protection Act. (This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.)
C = candidate for listing under the California Endangered Species Act.
SSC = species of special concern in California.
– = no listing.

California Native Plant Society

1A = List 1A species (plants presumed extinct in California).
1B = List 1B species (plants that are rare, threatened, or endangered in California and elsewhere).
2 = List 2 species (plants that are rare, threatened, or endangered in California but more common elsewhere).
3 = List 3 species (plants about which more information is needed to determine their status).
4 = List 4 species (plants of limited distribution).
– = no listing.
* = known populations believed extirpated from that county.
? = population location within county uncertain.

Table A-2. Special-Status Fish and Wildlife Species and Their Occurrence

Common and Scientific Name	Legal Status[a] Federal/State	California Distribution	Habitats	Reason for Determination of No Effect
Invertebrates				
Vernal pool fairy shrimp *Branchinecta lynchi*	T/–	Central Valley, central and southern Coast Ranges from Tehama County south to Santa Barbara County; isolated populations also in Riverside County.	Common in vernal pools; also found in sandstone rock outcrop pools.	No suitable habitat present in project area.
Vernal pool tadpole shrimp *Lepidurus packardi*	E/–	Shasta County south to Merced County.	Vernal pools and ephemeral stock ponds.	No suitable habitat present in project area.
Bay checkerspot butterfly *Euphydryas editha bayensis*	T/–	Vicinity of San Francisco Bay.	Native grasslands on outcrops of serpentine soil; California plantain and owl's clover are host plants.	No suitable habitat present in project area.
Amphibians and Reptiles				
Western pond turtle *Clemmys marmorata*	SC/SSC	West of the Sierra Nevada and west of the San Joaquin Valley, from the San Francisco Bay area south as far as the middle of the Baja California peninsula. Known to occur in Coyote Creek; potential habitat is found along all riparian corridors of the San Jose area.	Permanent freshwater ponds, lakes, marshes, and rivers.	Not observed during field surveys.
California red-legged frog *Rana aurora draytonii*	T/SSC	Along the coast and in coastal mountains from Humboldt County south to San Diego County.	Permanent and semipermanent aquatic habitats such as creeks and coldwater ponds with emergent and submergent vegetation and riparian species along the edge. May estivate in rodent burrows or cracks during dry periods.	Recorded in project area prior to 1980. Observed in 1996 in the Alamitos Creek watershed.

Common and Scientific Name	Legal Status[a] Federal/State	California Distribution	Habitats	Reason for Determination of No Effect
Foothill yellow-legged frog *Rana boylii*	SC/SSC	Klamath and Cascade Ranges, Coast Ranges, and Transverse Ranges, and as far south as Kern County in the Sierra Nevada foothills, to elevations of approximately 6,000 feet (1,800 m).	Creeks or rivers in woodlands or forests with rock and gravel substrate and low overhanging vegetation along the edge; usually found near riffles with rocks and sunny banks nearby.	Not observed during field surveys. Not likely to occur in project area.
Giant garter snake *Thamnophis gigas*	T/T	Central Valley from Fresno north to the Gridley/Sutter Buttes area; has been extirpated from areas south of Fresno.	Sloughs, canals, and other small waterways with a prey base of small fish and amphibians. Requires grassy banks and emergent vegetation for basking, and areas of high ground protected from flooding during winter.	Project is outside known range of species.
San Francisco garter snake *Thamnophis sirtalis tetrataenia*	E/E	Northern San Mateo County and south along the coast; eastern slope of the Santa Cruz Mountains to the Santa Clara County line.	Favors ponds, lakes, and marshy areas containing abundant vegetation for cover.	Project is outside known range of species.
Fishes				
Chinook salmon *Oncorhynchus tshawytscha*	C/–	Along the Pacific coast from Alaska to the Ventura River in southern California. A small population occurs in the Guadalupe River, Los Gatos Creek, and Coyote Creek; they may be strays from wild or hatchery populations from the Sacramento–San Joaquin River system.	Cold freshwater streams with suitable gravel beds for spawning. Require open passage to ocean for migration.	The proposed project will benefit chinook salmon by increasing habitat diversity and decreasing water temperatures. Potential short-term impacts are being addressed via construction guidelines and/or construction features.

Common and Scientific Name	Legal Status[a] Federal/State	California Distribution	Habitats	Reason for Determination of No Effect
Steelhead *Oncorhynchus mykiss*	T/–	Along the Pacific coast from Alaska to Baja California, and in interior rivers in British Columbia, Alberta, and California. Historically occurred throughout the Guadalupe River system; now thought to be re-extending their range to Guadalupe Reservoir.	Cool freshwater streams with adequate flow, well-oxygenated water, and good water quality. Require open passage to ocean for migration.	The proposed project will benefit steelhead by increasing habitat diversity and decreasing water temperatures. Potential short-term impacts are being addressed via construction guidelines and/or construction features.
Birds				
Bald eagle *Haliaeetus leucocephalus*	PD/E	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe basin; reintroduced into central California coast region. Winter range includes the rest of California except the southeastern deserts, high elevations in the Sierra Nevada, and the region east of the Sierra Nevada and south of Mono County. Range expanding.	Nests and roosts in coniferous forests within 1 mile of a lake, a reservoir, a stream, or the ocean.	Species occasionally may occur in project area. However, no known nesting areas or wintering sites exist in the project area.
Black rail *Laterallus jamaicensis*	SC/T	Permanent resident in the San Francisco Bay area and eastward through the Delta into Sacramento and San Joaquin Counties. Small populations in Marin, Santa Cruz, San Luis Obispo, Orange, Riverside, and Imperial Counties.	Tidal salt marshes associated with heavy growth of pickleweed; also occurs in brackish marshes or freshwater marshes at low elevations	No suitable habitat occurs in the project area.

Table A-2. Continued

Common and Scientific Name	Legal Status[a] Federal/State	California Distribution	Habitats	Reason for Determination of No Effect
Burrowing owl *Athene cunicularia*	SC/SSC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along southern California coast.	Nests in rodent burrows in sparse grassland, desert, and agricultural habitats.	No suitable nesting habitat occurs in the project area.
California brown pelican *Pelecanus occidentalis* (nesting colony)	E/E	Along entire California coastline; does not breed north of Monterey County. Extremely rare inland.	Typically found in littoral zone immediately outside the surf line. Nests on offshore islands.	Species may occur in vicinity of project area (in San Francisco Bay). However, no habitat would be affected by the project and no known nesting areas exist in the project area.
California clapper rail *Rallus longirostris obsoletus*	E/E	San Francisco Bay area and east to the vicinity of Suisun Bay.	Tidal salt marshes and sloughs; usually associated with heavy growth of pickleweed. Feeds on mollusks removed from slough muds.	Species occurs in the lower Guadalupe River/Alviso Slough area. However, no suitable habitat occurs in the project area.
California least tern *Sterna antillarum browni* *(=Sterna albifrons browni)*	E/E	Nests on beaches along San Francisco Bay and along the coast from southern San Luis Obispo County to San Diego County.	Nests on upper portions of sandy beaches and occasionally on mudflats; forages in adjacent surf, on estuaries, or in the open ocean.	Species may occur in the southern San Francisco Bay area. However, no habitat would be affected by the project and no suitable nesting habitat occurs in the project area.
Marbled murrelet *Brachyramphus marmoratus*	T/E	Nests from the Oregon border to Eureka and between Santa Cruz and Half Moon Bay. Winters in nearshore and offshore waters along the entire California coastline.	Requires mature coastal coniferous forests for nesting; nests in conifer stands more than 150 years old. May be found as much as 35 miles inland. Forages in coastal waters. Winters on subtidal and pelagic waters, often well offshore.	No suitable habitat occurs in the project area.

Table A-2. Continued

Common and Scientific Name	Legal Status[a] Federal/State	California Distribution	Habitats	Reason for Determination of No Effect
Mountain plover *Charadrius montanus*	C/SSC	Winters in the Central Valley south of Yuba County, along the coast in parts of San Luis Obispo, Santa Barbara, Ventura, and San Diego Counties, and in parts of Imperial, Riverside, Kern, and Los Angeles Counties. Does not breed in California.	Occupies open plains or rolling hills with short grasses or very sparse vegetation; may use newly plowed or sprouting grainfields. Does not require bodies of water nearby.	No suitable habitat occurs in the project area.
Northern harrier *Circus cyaneus*	–/SSC	Throughout lowland California. Has been recorded at high elevations in fall.	Grasslands, meadows, marshes, and seasonal and agricultural wetlands providing tall cover for nests constructed on the ground.	No suitable nesting habitat occurs in the project area.
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	SC/SSC	Restricted to the San Francisco Bay area (Alameda, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma) counties	Freshwater marshes in summer and salt or brackish marshes in fall and winter. Requires tall grasses, tules, and willow thickets for nesting and cover.	Species does not occur in the project area, although common yellowthroats (*Geothlypis trichas*) are present.
Tricolored blackbird *Agelaius tricolor*	SC/SSC	Largely endemic to California. Permanent resident in the Central Valley from Butte County south to Kern County and at scattered coastal locations from Marin County south to San Diego County. Feeds at scattered locations in Lake, Solano, and Sonoma Counties. Rare nester in Siskiyou, Modoc, and Lassen Counties.	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields. Nesting habitat must be large enough to support 50 pairs. Probably requires water at or near the nesting colony. Requires large foraging areas, including marshes, pastures, agricultural wetlands, dairies, and feedlots, where insect prey is abundant.	May occur in the project area. Has been observed at Calero Reservoir in the Alamitos Creek watershed.

Common and Scientific Name	Legal Status[a] Federal/State	California Distribution	Habitats	Reason for Determination of No Effect
Western snowy plover *Charadrius alexandrinus nivosus*	T/SSC (coastal) –/SSC (inland)	Winters along the California coast from Del Norte County to San Diego County. Breeding sites within this range are very limited. Nests at inland lakes throughout northeastern, central, and southern California.	Above the normal high-tide line on coastal beaches where wood or other debris provides cover, and on shores of inland salt ponds and alkali or brackish inland lakes.	Species occurs at salt ponds downstream of Alviso. However, no suitable habitat occurs in the project area.
Mammals				
Riparian brush rabbit *Sylvilagus bachmani riparius*	C/SSC	Limited to San Joaquin County (at Caswell State Park near the confluence of the Stanislaus and San Joaquin Rivers).	Dense thickets of brush associated with riparian or chaparral habitats.	Project area is outside known range of species. No suitable habitat occurs in the project area.
Salt marsh harvest mouse *Reithrodontomys raviventris*	E/E	San Francisco, San Pablo, and Suisun Bays.	Salt marshes with a dense plant cover of pickleweed and fat hen, adjacent to an upland site.	Species occurs in the lower Guadalupe River/Alviso Slough area. No known occurrences in the project area. No suitable habitat occurs in the project area.
Salt marsh vagrant (wandering) shrew *Sorex vagrans halicoetes*	SC/SSC	Restricted to southern and northwestern San Francisco Bay.	Midelevation salt marsh habitats with dense growths of pickleweed; requires driftwood and other objects for nesting cover.	No suitable habitat occurs in the project area.
San Joaquin kit fox *Vulpes macrotis mutica*	E/T	Occurs principally in the San Joaquin Valley and adjacent open foothills to the west. Recent records from 17 counties, from Contra Costa County south to Kern County.	Saltbush scrub, grassland, oak, savanna, and freshwater scrub.	No suitable habitat occurs in the project area.

[a] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
PE = proposed for listing as endangered under the federal Endangered Species Act.
PT = proposed for listing as threatened under the federal Endangered Species Act.
C = candidate species; species for which USFWS has sufficient information on file regarding biological vulnerability and threat(s) to support issuance of a proposed rule to list.
SC = species of concern; species for which existing information may warrant listing but for which substantial biological information to support a proposed rule to list is lacking.
PD = proposed for federal delisting.
– = no listing.

State

E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
R = listed as rare under the California Native Plant Protection Act. (This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.)
C = species is a candidate for listing under the California Endangered Species Act.
SSC = state species of special concern.
FP = species is fully protected in California under California Fish and Game Code, Section 3511 (birds), 4700 (mammals), and 5050 (reptiles and amphibians).
– = no listing.

Appendix B. Acoustics Terminology Used in This Document

B.1 ACOUSTICS TERMINOLOGY USED IN THIS DOCUMENT

Sound	A disturbance created by a vibrating object and transmitted as pressure waves through air or water to a receiver such as the human ear. In general, sound waves travel away from the sound source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from the source. Thus, loudness decreases at increasing distances from the sound source. In general, human sound perception is such that a 3-dB change in sound level is barely noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling (or halving) the ambient sound level. In addition, most people have difficulty distinguishing the louder of two sounds if they differ by less than 1.5–2.0 dB. Doubling or halving acoustic energy will change the resulting sound level by 3 dB, corresponding to a barely perceptible change. In practice, this means that doubling the traffic volume on a roadway (or doubling the number of people in a stadium or the number of wind turbines on a wind farm) will, as a general rule, result in a 3-dB, or or barely perceptible, increase in noise.
Noise	Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
Decibel (dB)	A unitless measure of sound equal to the squared ratio of sound pressure amplitude to a reference sound pressure amplitude, expressed on a logarithmic scale. For sound the reference pressure is 20 micro-Pascals.
A-Weighted Decibel (dBA)	A frequency-weighted measure of sound (in decibels) that approximates the frequency response of the human ear.
Day-Night Level (L_{dn})	The energy average of the A-weighted sound levels that occur during a 24-hour period, with 10 dB added to the sound levels between 10 p.m. and 7 a.m.
Ambient Sound	The all-encompassing sound associated with a given community site. It is usually a composite of sounds from many sources, near and far, with no particular sound being dominant.

SPECIES KNOWN OR THOUGHT TO OCCUR IN THE PROJECT AREA, AND THEIR TYPICAL HABITATS

Species	Oak Savannah	Riparian Forest and Scrub	Percolation Pond	Open Water
Amphibians				
Western toad *Bufo boreas*		✓	✓	✓
Pacific chorus frog *Pseudacris regilla*		✓	✓	✓
Bullfrog *Rana catesbeiana*		✓	✓	✓
Reptiles				
Racer *Coluber constrictor*	✓	✓		
Western rattlesnake *Crotalus viridis*	✓	✓		
Southern alligator lizard *Elgaria multicarinatus*	✓	✓		
Western skink *Eumeces skiltonianus*	✓	✓		
California whipsnake *Masticophis lateralis*	✓	✓		
Gopher snake *Pituophis melanoleucas*	✓	✓		
Western fence lizard *Sceloporus occidentalis*	✓	✓		
Common garter snake *Thamnophis sirtalis*	✓	✓		
Red-eared slider *Trachemys scripta*			✓	✓
Fish				
Goldfish *Carassius auratus*				✓
Sacramento sucker *Catostomus occidentalis*				✓
California roach *Hesperoleucus symmetricus*				✓
Pacific lamprey *Lampetra tridentata*				✓

Table C-1. Continued

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Species	Oak Savannah	Riparian Forest and Scrub	Percolation Pond	Open Water
Green sunfish *Lepomois cyanellus*			✓	✓
Bluegill *Lepomis macrochirus*				✓
Largemouth bass *Micropterus salmoides*			✓	✓
Rainbow trout/Steelhead *Oncorhynchus mykiss*				✓
Chinook salmon *Oncorhynchus tshawytscha*				✓
Black crappie *Pomoxis nigromaculatus*			✓	✓
Birds				
Cooper's hawk *Accipiter cooperii*	✓	✓		
Sharp-shinned hawk *Accipiter striatus*	✓	✓		
Western grebe *Aechmophorus occidentalis*			✓	
Red-winged blackbird *Agelaius phoeniceus*		✓	✓	✓
American wigeon *Anas americana*			✓	✓
Northern shoveler *Anas clypeata*			✓	✓
Mallard *Anas platyrhynchos*		✓	✓	✓
Gadwall *Anas strepera*		✓	✓	✓
Western scrub-jay *Aphelocoma californica*	✓	✓		
Great egret *Ardea alba*	✓	✓	✓	✓
Great blue heron *Ardea herodias*	✓	✓	✓	✓
Ring-necked duck *Aythya collaris*			✓	✓

Table C-1. Continued

Species	Oak Savannah	Riparian Forest and Scrub	Percolation Pond	Open Water
Cedar waxwing *Bombycilla cedrorum*	✓	✓		
Canada goose *Branta canadensis*			✓	✓
Great horned owl *Bubo virginianus*	✓	✓		
Bufflehead *Bucephala albeola*			✓	✓
Common goldeneye *Bucephala clangula*			✓	✓
Red-tailed hawk *Buteo jamaicensis*	✓	✓		
Red-shouldered hawk *Buteo lineatus*	✓	✓		
Green heron *Butorides virescens*		✓	✓	✓
California quail *Callipepla californica*	✓	✓		
Anna's hummingbird *Calypte anna*	✓	✓		
Lesser goldfinch *Carduelis psaltria*	✓	✓		
American goldfinch *Carduelis tristis*	✓	✓		
House finch *Carpodacus mexicanus*	✓	✓		
Purple finch *Carpodacus purpureus*	✓	✓		
Turkey vulture *Cathartes aura*	✓	✓	✓	
Belted kingfisher *Ceryle alcyon*	✓	✓	✓	✓
Vaux's swift *Chaetura vauxi*	✓	✓	✓	✓
Killdeer *Charadrius vociferus*	✓	✓	✓	
Northern harrier *Circus cyaneus*	✓	✓		

Table C-1. Continued

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Species	Oak Savannah	Riparian Forest and Scrub	Percolation Pond	Open Water
Marsh wren *Cistothorus palustris*				
Northern flicker *Colaptes auratus*	✓	✓		
Rock dove *Columba livia*	✓	✓		
American crow *Corvus brachyrhynchos*	✓	✓	✓	
Common raven *Corvus corax*	✓	✓	✓	
Yellow-rumped warbler *Dendroica coronata*	✓	✓		
Yellow warbler *Dendroica petechia*		✓		
Snowy egret *Egretta thula*		✓	✓	
White-tailed kite *Elanus leucurus*	✓			
Brewer's blackbird *Euphagus cyanocephalus*	✓	✓		
Merlin *Falco columbarius*	✓	✓		
American kestrel *Falco sparverius*	✓	✓		
American coot *Fulica americana*		✓	✓	✓
Common yellowthroat *Geothlypis trichas*		✓		
Barn swallow *Hirundo rustica*	✓	✓	✓	
Bullock's oriole *Icterus bullockii*	✓	✓		
Dark-eyed junco *Junco hyemalis*		✓		
Herring gull *Larus argentatus*			✓	
California gull *Larus californicus*			✓	✓

Table C-1. Continued

Species	Oak Savannah	Riparian Forest and Scrub	Percolation Pond	Open Water
Ring-billed gull *Larus delawarensis*			✓	✓
Acorn woodpecker *Melanerpes formicivorus*	✓	✓		
Song sparrow *Melospiza melodia*		✓		
Common merganser *Mergus merganser*		✓	✓	✓
Northern mockingbird *Mimus polyglottos*	✓	✓		
Brown-headed cowbird *Molothrus ater*	✓	✓		
Ash-throated flycatcher *Myiarchus cinerascens*	✓	✓		
Black-crowned night-heron *Nycticorax nycticorax*		✓	✓	✓
MacGillivray's warbler *Oporornis tolmiei*		✓		
Ruddy duck *Oxyura jamaicensis*			✓	
Oak titmouse *Baeolophus inornatus*	✓	✓		
Chestnut-backed chickadee *Parus rufescens*	✓	✓		
House sparrow *Passer domesticus*	✓	✓		
Brown pelican *Pelecanus occidentalis*			✓	✓
Double-crested cormorant *Phalacrocorax auritus*			✓	✓
Nuttall's woodpecker *Picoides nutallii*	✓	✓		
Downy woodpecker *Picoides pubescens*		✓		
California towhee *Pipilo crissalis*	✓	✓		
Spotted towhee *Pipilo maculatus*	✓	✓		

Table C-1. Continued

Species	Oak Savannah	Riparian Forest and Scrub	Percolation Pond	Open Water
Pied-billed grebe *Podilymbus podiceps*			✓	✓
Bushtit *Psaltriparus minimus*	✓	✓		
Ruby-crowned kinglet *Regulus calendula*	✓	✓		
Golden-crowned kinglet *Regulus satrapa*	✓	✓		
Black phoebe *Sayornis nigricans*	✓	✓	✓	✓
Say's phoebe *Sayornis saya*	✓			
Rufous hummingbird *Selasphorus sasin*	✓	✓		
Western bluebird *Sialia mexicana*	✓	✓		
White-breasted nuthatch *Sitta carolinensis*	✓			
Red-breasted sapsucker *Sphyrapicus ruber*		✓		
Northern rough-winged swallow *Stelgidopteryx serripennis*	✓	✓	✓	
Caspian tern *Sterna caspia*			✓	✓
Forster's tern *Sterna forsteri*			✓	✓
Western meadowlark *Sturnella neglecta*	✓			
European starling *Sturnus vulgaris*	✓	✓		
Tree swallow *Tachycineta bicolor*	✓	✓	✓	
Violet-green swallow *Tachycineta thalassina*	✓	✓	✓	
Bewick's wren *Thryomanes bewickii*	✓			
California thrasher *Toxostoma redivivum*	✓	✓		

Table C-1. Continued

Species	Oak Savannah	Riparian Forest and Scrub	Percolation Pond	Open Water
House wren *Troglodytes aedon*	✓	✓		
Western kingbird *Tyrannus verticalis*	✓	✓		
Barn owl *Tyto alba*	✓	✓		
American robin *Turdus migratorius*	✓	✓		
Mourning dove *Zenaida macroura*	✓	✓		
Golden-crowned sparrow *Zonotrichia atricapilla*	✓	✓		
White-crowned sparrow *Zonotrichia leucophrys*	✓	✓		
Mammals				
Coyote *Canis latrans*	✓	✓		
Virginia opossum *Didelphis virginiana*	✓	✓		
Feral cat *Felis catus*	✓	✓		
Black-tailed hare *Lepus californicus*	✓	✓		
Striped skunk *Mephitis mephitis*	✓	✓		
House mouse *Mus musculus*	✓	✓		
Long-tailed weasel *Mustela frenata*	✓	✓		
Mule deer *Odocoileus hemionus*	✓	✓		
Deer mouse *Peromyscus maniculatus*	✓	✓		
Raccoon *Procyon lotor*	✓	✓		
Norway rat *Rattus norvegicus*	✓	✓		

Table C-1. Continued

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Species	Oak Savannah	Riparian Forest and Scrub	Percolation Pond	Open Water
Black rat *Rattus rattus*	✓	✓		
Western harvest mouse *Reithrodontomys megalotis*	✓	✓		
Gray squirrel *Sciurus carolinensis*	✓	✓		
Fox squirrel *Sciurus niger*	✓	✓		
Desert cottontail *Sylvilagus audubonii*	✓	✓		
Gray fox *Urocyon cinereoargenteus*	✓	✓		
Red fox *Vulpes vulpes*	✓	✓		

Appendix C. Species Known or Thought to Occur in the Project Area, and Their Typical Habitats

Appendix D. Public and Agency Comments and Responses to Comments

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Appendix D. Public and Agency Comments and Responses to Comments

Upon completion of the draft version of this environmental impact report/environmental impact statement (EIR/EIS) in November 2000, the lead agencies issued a notice announcing the availability of the draft EIR/EIS for a 45-day review and comment period. During this period, members of the public and staff of state and federal regulatory agencies reviewed and commented on the draft. The public comment period closed January 8, 2001 and the federal review period closed January 22, 2001. Additional public and agency input was garnered at a public hearing held on December 19, 2000.

This appendix was prepared in compliance with the requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) that the lead agencies respond in writing to all comments received. It presents

- all comments received in response to the draft version of this EIR/EIS, and
- responses to all comments received.

This appendix is divided into two sections. Section D.1 presents master responses to frequently received comments; these correspond roughly to the topic areas identified in the *Issues of Known Controversy* section of Chapter 1. Section D.2 reproduces individual comment letters and e-mails along with corresponding responses. It also contains the District transcript of comments received at the December 19, 2000 public hearing and responses to these comments.

A number of commentors submitted more than one letter or e-mail or submitted both written and oral (public hearing) comments. Section D.2 is ordered so that each commentor's comments all appear together, organized by date received. The public hearing transcript appears on page D-22 and is cross-referenced in subsequent sections.

D.1 MASTER RESPONSES TO FREQUENTLY RECEIVED COMMENTS

D.1.1 Master Response 1. Regional Efforts to Combat Mercury Contamination in the Guadalupe River Watershed

This master response was prepared in order to address comments regarding existing mercury-related conditions within the Guadalupe Creek and Guadalupe River watersheds. This response provides information on the historic background of mercury contamination in the

Guadalupe River watershed and information on cooperative efforts to address mercury-related issues on a watershed scale.

The bedrock of the Santa Cruz Mountains hosts important deposits of mercury ores, which were mined by the Ohlone prior to European contact and later became a mainstay of the region's economy during the California Gold Rush. Overland and stream transport of naturally eroded mercury-rich sediments has combined with leaching and remobilization of mine tailings to distribute mercury downstream in the Guadalupe River watershed. Mercury contamination is now recognized as an issue of regional importance throughout the Guadalupe River watershed; because the problem is regional in scope, there is a general consensus among regulatory agencies and local governments that it must be addressed through cooperative efforts at a regional scale. The District is a key participant in two cooperative efforts aimed at improving water quality throughout the region.

One such effort is the Santa Clara Basin Watershed Management Initiative (WMI). Begun in 1996, with a stated mission of "protecting and enhancing the watershed, [and] creating a sustainable future for the community and the environment," the WMI was jointly conceived by the U.S. Environmental Protection Agency (EPA), the State Water Resources Control Board (SWRCB), the Santa Clara Valley Water District (District), and the San Francisco Bay Regional Water Quality Control Board (RWQCB). The WMI addresses all sources of pollution threatening San Francisco Bay, including mercury, with the goal of coordinating existing regulatory activities on a basinwide scale. Because of its regional scope, the WMI involves numerous stakeholders representing a cross section of the Santa Clara Basin business, agricultural, residential, environmental, and regulatory communities. A major milestone of the WMI will be the development and approval of a regional watershed management plan. Additional information on the WMI can be obtained at the Santa Clara Basin Watershed Management Initiative website (www.scbwmi.org).

A second important regional water-quality effort is the TMDL (total maximum daily load) program administered by the RWQCB and the District under the authority of Section 303(d) of the federal Clean Water Act (CWA). CWA Section 303(d) requires the SWRCB and the state's Regional Water Quality Control Boards to identify bodies of water as impaired when local regulatory controls have failed to maintain designated water quality standards, and to prepare a TMDL program for waters so identified. A TMDL is essentially a quantitative assessment of a water quality problem. The TMDL value represents the loads of a specified pollutant that individual sources may contribute to a watershed. Once the allowable loads have been established and existing source loads determined, reductions in allowable loads can be allocated to individual pollutant sources. These reduced loads are enforced by the RWQCB under the auspices of the CWA.

As described in Chapters 1 and 3 of this EIR/EIS, the southern part of San Francisco Bay and parts of the Guadalupe River system (including Guadalupe Creek) are listed as impaired for mercury. The RWQCB has prepared a draft TMDL program for mercury in San Francisco Bay. The draft program

- calls for a significant reduction in the transport of mercury to San Francisco Bay by the Guadalupe River system, and

- establishes a specific goal of reducing the concentration of mercury in sediments to less than 0.4 milligram per kilogram (mg/kg) total mercury relative to the percentage of material less than 63 micrometers (µm) in diameter.

The RWQCB's final TMDL program and implementation plan are scheduled for completion in 2003–2004.

D.1.2 Master Response 2. Relationship between the Proposed Project (Phase 2 of the Guadalupe Creek Restoration Project) and the Los Capitancillos Freshwater Wetlands Project

This master response was prepared in response to comments regarding the relationship between the Guadalupe Creek Restoration Project and the Los Capitancillos Freshwater Wetland Mitigation Site Development Project. As described in Chapter 1, the Guadalupe Creek Restoration Project comprises two separate project phases, both of which focus on restoring riparian vegetation and coldwater fish habitat along the 1.7-mile stretch of Guadalupe Creek between Masson Dam and Almaden Expressway. Phase 1, completed in 1998, included planting 1,263 linear feet of riparian vegetation along the Creek downstream from Masson Dam. If Phase 2 is implemented, it will result in the installation of approximately 6 acres of riparian vegetation, approximately 13,000 linear feet of shaded riverine aquatic (SRA) cover vegetation, and various aquatic habitat features between Almaden Expressway and Masson Dam. Phase 2 of the Guadalupe Creek Restoration Project represents the proposed project analyzed in this EIR/EIS; it is the only project effort addressed in this impact analysis.

In addition to the riparian and fish-habitat restoration measures comprised under the aegis of the Guadalupe Creek Restoration Project, the District has also recently proposed a separate project that would entail the construction of a 5-acre seasonal freshwater wetland on a District-owned parcel near Masson Dam, adjacent to the Guadalupe Creek Restoration Project site. This proposed effort, the Los Capitancillos Freshwater Wetland Mitigation Site Development Project, would establish common seasonal freshwater plants and provide habitat for associated vertebrate and invertebrate species. The Los Capitancillos Freshwater Wetland Project is independent of the Guadalupe Creek Restoration Project, and is currently in the early planning phase. Under the proposed conceptual plan for the Los Capitancillos site, no surface water from the wetland mitigation site would flow into Guadalupe Creek. Additionally, the proposed design for the Guadalupe Creek Restoration Project includes a berm that will restrict Guadalupe Creek floodflows from entering the Los Capitancillos site. Potential environmental impacts associated with the Los Capitancillos Freshwater Wetland Mitigation Site Development Project will be addressed in separate environmental documentation tentatively slated for completion in fall 2001.

D.1.3 Master Response 3. Recreation

This master response was prepared in order to address comments regarding existing and future recreational opportunities within the Guadalupe Creek Restoration Project area.

The majority of the land in and directly adjacent to the project site is owned by the District. Access to the site is restricted and the project site is almost entirely bordered by fences with locked gates. At this time, the only public activities approved within the project site are environmental education programs involving local schools. Current educational uses of the site will continue once construction is complete; the District will coordinate with Pioneer High School to ensure the safety of student participants and protection of the mitigation plantings.

At present, the District has no plans to open the project site to future recreational use. However, the project site has been identified in the Santa Clara County Countywide Trails Master Plan. If the Plan is realized, the project site could be incorporated into the Guadalupe Trail. Currently, the District is working in coordination with the City of San Jose on the Guadalupe Creek Master Plan. Through this cooperative planning process, the District and the City will identify a trails plan that will provide appropriate recreational opportunities while protecting the mitigation site.

D.1.4 Master Response 4. Construction Traffic Safety Measures

This master response was prepared in order to address comments regarding potential construction-related traffic impacts associated the Guadalupe Creek Restoration Project.

As described in Section 2.5.1.5.9 of the project EIR/EIS, the District will require the selected contractor to prepare and implement a traffic safety plan. This plan will address vehicle size and speed, travel routes, detour and closure plans, flagperson requirements, locations of turnouts to be constructed, and other key factors. Implementation of the traffic safety plan will be coordinated with appropriate state and local agencies.

Access to the site will be limited to Almaden Expressway and Singletree Way via Blossom Hill Road to prevent construction traffic from entering adjacent residential neighborhoods. Traffic related to normal construction activities will enter and exit the site from the Meridian Avenue Bridge and Almaden Expressway. There will be no heavy equipment traffic on Coleman Road west of the Meridian Avenue Bridge and construction traffic will not be routed near Guadalupe School.

Appendix C of the Engineer's Report contains a draft set of plans that includes a figure (GEN-1) identifying site access points, staging areas, and haul routes.

D.2 COMMENT LETTERS AND CORRESPONDING RESPONSES

D.2.1 Comments from Patrick Pizzo, 1555 Oak Canyon Drive, San Jose, CA 95120 (December 17, 2000)

December 17, 2000

Mr. Al Gurevich, Project Manager
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Re: Comments on "Notice of Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS), November '00"

This is in response to your request for comments on the subject draft-report. I am pleased to see that the issue of mercury contamination (total and methyl-mercury) has been considered in the November 2000 EIR/EIS Environmental Impact report. However, I do have further questions and points of discussion; and I document them herein.

1- Mercury contamination levels exceeding 'safe' limits are reported within the proposed Guadalupe restoration area. Sections 3-24, 25, 30 & 31 report concentrations greater than 20mg/Kg within the soil and concentrations [of methyl-mercury] exceeding 20 ng/liter within the water and/or biological specimens. Yet, the following is stated in Section 4-10, *Impact of Mercury Contamination*: 1-1

"Thus the proposed project is unlikely to result in adverse affects on fish and wildlife from increased exposure to mercury. The impact is considered less than isgnificant"

How is this conclusion supported? I was unable to find citation of scientific papers or governmental reports in the draft document to substantiate these statements.

2- There is argument within the draft document to suggest that cooler temperatures resulting from the planting of native shade trees along the 1-2 creek will decrease the production rate and/or subsequent uptake rate of methyl-mercury by cold water fish species (such as steelhead trout and coho salmon). This assumes that the methyl mercury originates within the subject restoration area. However, this is not necessarily the case. Methyl-mercury likely originates from free-mercury contamination upstream from the restoration area, in the original mine tailings. These surface tailings are a common feature of the Quicksilver County Park, for example. Additionally, in Phase II of the restoration, there is plan to develop a winter wetlands region adjacent the Oak Canyon development. This region will accept flood waters and/or overflow in the winter months to support an interim wetlands region. In the summer, these wetlands will be allowed to dry. Thus free-mercury contamination will be introduced annually; and undoubtedly methyl-mercury will be produced in the process. These regions are necessarily 'open' and 'warm' as they are directly exposed to the sun. Thus, it is difficult to see how free- and methyl-mercury contamination levels in the restored area will be any different than that documented by the sampling data reported in the November EIR/EIS Report. 1-2 cont'd

3- There is argument in the report that the Guadalupe restoration will result in tree-shaded creek favoring seed-eating birds species rather than, for example heron and egret populations. Thus, it is argued, the methyl-mercury biological uptake will be reduced. However, as pointed-out in Item (2), above, phase II of the restoration project includes creation of a wetlands region adjacent the Oak Canyon Development. Indeed the Phase I maps indicate this region, where substantial soil is being removed, in each of the four (or so) alternatives. Is not the purpose of these wetlands, in part, to attract wildlife such as herons and egrets? Please clarify the argument presented in the draft report. 1-3

4- It is also argued in the Draft EIR/EIS report that the cold water fish species attracted to the restoration region of the Guadalupe will only be in the creek for approximately two-years. It is indicated too that these species 1-4 have been shown to uptake less methyl-mercury than warm water species, given equivalent contamination exposure. However, two points:

- a- the cold-water fish species (coho salmon and steelhead trout) will be fingerlings during this two-year exposure
- b- cold-water fish species presently do not live in this habitat in substantial numbers

On the basis of item (a), above, can it not be demonstrated that anticipated methyl-mercury contamination levels will be more of a problem than if the fish were exposed near the end of their life-cycle? Acceptable lead contamination levels for human babies are much lower than the safe-thresholds established for adults. This is both an issue of relative size; and of increased sensitivity during the development cycle of human organs. Are there data to show that this is not true for fish? 1-4 cont'd

On the basis of item (b), one can only argue for increased exposure of mercury contamination to the subject cold-water fish populations being attracted to the Guadalupe restoration area.

5- There are some 42,000 cubic yards of soil to be removed in support of the proposed Guadalupe restoration (less depending on which alternative within the EIR/EIS report will be selected). Much of this soil, if not all, has been shown to contain mercury in excess of acceptable threshold levels. How will this soil be disposed? Are the costs associated with this hazardous waste removal reflected in the EIR/EIS report? 1-5

6- Realizing that the source of mercury contamination lies upstream from the restoration region, and that a major function of the Guadalupe creek is to drain flood-waters during periods of excessive rain, what is the long-term maintenance plan to deal with increased load of mercury and methyl-mercury in the subject restoration region? 1-6

In summary, I cannot follow the argument that the proposed project is unlikely to result in adverse effects on fish and wildlife from increased exposure to free- and methyl-mercury. After all, sampling did indicate that mercury contamination levels do exceed allowable threshold values. Also, what data are there to support the statement that the impact of the recorded mercury contamination can be considered to be less than significant? 1-7

A major objective of the subject Guadalupe restoration project is to "offset environmental impact on downtown restoration . Realizing that the Guadalupe and the Alamitos creeks are natural drain to the world's second most productive mercury ore fields, perhaps this environmental offset should be done in some other region of the Bay Area? 1-8

I would like nothing better than to see cold-water fish species in the creeks surrounding San Jose. But there is clear environmental argument to suggest that this may not be a wise plan. If the project is successful, in terms of attracting migrating fish populations to the Guadalupe, then a major consequence of success will be to increase the methyl-mercury content of the world's food-chain, and this must be carefully considered. 1-9

Respectfully submitted,

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ppizzo@email .sjsu.edu
408-924-6509

D.2.2 Responses to Comments from Patrick Pizzo, 1555 Oak Canyon Drive, San Jose, CA 95120 (December 17, 2000)

D.2.2.1 Response to Comment 1-1

Analysis of water samples collected in the project reaches of Guadalupe Creek in September 2000 showed total mercury concentrations ranging from 12 to 74 nanograms per liter (ng/l) and methyl mercury concentrations below 1 ng/l. The methyl mercury concentration of >20 ng/l referenced in this comment was measured on a sample of porewater. The average value for methyl mercury in porewater measured in September 2000 was 12.6 ng/l; values ranged from 0.16 to 60 ng/l. (*Porewater* refers to waters contained in minute spaces between the grains of soils or sediments; porewaters are not directly accessible to fish.)

There is some debate about the level of mercury exposure that can be considered "safe" for fish. However, the results of several experimental studies suggest that the mercury content of Guadalupe Creek waters under existing conditions in the project reach is below the "no observed effects" threshold for adult fish. For example, McKim et al. (1976) reported that concentrations of methylmercuric chloride[1] greater than 93 ng/l produced negative effects on adult brook trout. This is approximately 100 times greater than the maximum methyl mercury concentration measured in the project reach of Guadalupe Creek.

In general, fish eggs and larvae are more sensitive than adult fish to the negative effects of mercury exposure (Wiener and Spry 1996), but existing concentrations in the project reaches of Guadalupe Creek are likely still below the critical threshold. Latif et al. (2001) found that the offspring of fathead minnows (*Pimephales promelas*) showed reduced growth when exposed to inorganic mercury concentrations of 260 ng/l. Other species were found to be more sensitive; fertilization and larval growth of walleye (*Stizostedion vitreum*) were unaffected by methyl mercury concentrations of 0.1–7.8 ng/l, but concentrations above 2 ng/l were shown to reduce hatching success slightly (Latif et al. 2001). However, this is still significantly greater than the measured maximum concentration of 0.9 ng/l in the project reaches of Guadalupe Creek.

The proposed project incorporates design features expected to ensure that project implementation will not increase mercury content in Guadalupe Creek waters within and downstream of the project area, or the uptake of existing mercury by fish and wildlife in the project area, as compared to existing conditions. These features are discussed in detail in Chapter 4 of the EIR/EIS. Briefly, they include the following.

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[1] Methyl mercury exists in several forms in the water column; it may be chemically bound to chloride, sulfate, or dissolved organic carbon. The form of methyl mercury influences its solubility in water and its sorption to solid phases. These parameters in turn control its bioavailability, although the original form is less important once methyl mercury has entered the food web.

Methylmercuric chloride is commonly used in experiments because it is one of the more soluble forms of methyl mercury. However, laboratory analytical methods measure total methyl mercury and do not distinguish between the various forms of methyl mercury.

(1) Excavation and appropriate disposal of soils and sediments with mercury concentrations in excess of 20 mg/kg (see response to Comment 1-5 and *Soil Management Plan* text in the *Best Management Practices* section of EIR/EIS Chapter 2).

(2) Increase in riparian canopy cover, increasing stream shading and decreasing water temperatures. Increased canopy cover and lowered water temperatures will shift the area's food web to reduce the abundance of organisms likely to take up and accumulate mercury.

In addition, careful design of channel features such as the low-flow channel and created pools will help to ensure that instream conditions do not increase the potential for mercury methylation in the project area.

Finally, the proposed project incorporates a 5-year program of postproject water quality monitoring to make certain that project implementation does not result in unforeseen impacts on water quality, including mercury loading. This program is described in the response to Comment 6-2 and in Chapter 4 of the EIR/EIS.

D.2.2.2 Response to Comment 1-2

Please see Master Response 2. The District's proposed Los Capitancillos Freshwater Wetland Mitigation Site Development Project is a separate effort from the Guadalupe Creek Restoration Project. Under the proposed conceptual plan for the Los Capitancillos site, no surface water from the wetland mitigation site would flow into Guadalupe Creek. Additionally, the proposed design for the Guadalupe Creek Restoration Project includes a berm that will restrict Guadalupe Creek floodflows from entering the Los Capitancillos site. Potential environmental impacts associated with the proposed Los Capitancillos Freshwater Wetland Mitigation Site Development Project, including potential effects on mercury cycling, will be evaluated, and corresponding mitigation proposed for public review, in a separate environmental document tentatively slated for fall 2001 completion.

As discussed in Master Response 1, mercury contamination is a regional problem in the Guadalupe River watershed. Mr. Pizzo is correct in asserting that the mercury in the watershed (including the Guadalupe Creek drainage system) is ultimately derived from mercury ore deposits and associated mine tailings upstream in the Santa Cruz Mountains (see Master Response 1). However, as discussed in the *Hydrology and Water Quality* section of Chapter 3, analysis of water column samples collected from sites along Guadalupe Creek has shown that, under existing conditions,

- methylation of mercury is occurring upstream from the project site, and

- methlyation is probably occurring within the project site as well, particularly in areas that support riverine wetland vegetation and in deep pool environments.

The analysis of mercury-related impacts presented in Chapter 4 was based on these results. It assumed that methylation is occurring both upstream from and within the project site.

D.2.2.3 Response to Comment 1-3

Please see Master Response 2. The District's proposed Los Capitancillos Freshwater Wetland Mitigation Site Development Project is a separate effort from the Guadalupe Creek Restoration Project. Under the proposed conceptual plan for the Los Capitancillos site, no surface water from the wetland mitigation site would flow into Guadalupe Creek. Additionally, the proposed design for the Guadalupe Creek Restoration Project includes a berm that will restrict Guadalupe Creek floodflows from entering the Los Capitancillos site. Potential environmental impacts associated with the proposed Los Capitancillos Freshwater Wetland Mitigation Site Development Project, including potential effects on mercury cycling, will be evaluated, and corresponding mitigation proposed for public review, in a separate environmental document tentatively slated for fall 2001 completion. This document will also address details of project design for the proposed Los Capitancillos freshwater wetlands.

D.2.2.4 Response to Comment 1-4

Experimental results do show that adult fish are less susceptible to the effects of mercury exposure than eggs and juvenile stages. However, as discussed in the response to Comment 1-1 above, waterborne mercury concentrations in the project area are below the threshold expected to impede growth and development of native fish eggs and juveniles. Implementation of the proposed project is not expected to increase mercury loading in the project reaches of Guadalupe Creek. Moreover, although juvenile steelhead in particular accumulate mercury rapidly, steelhead mature in the ocean for 2–3 years before returning to their natal stream to spawn. During this time, adsorbed mercury is diluted by growth and may be eliminated by natural processes; the residence time of mercury in fish tissues is approximately 2 years (National Academy of Sciences 1978). Thus, mercury levels in tissues of adult steelhead returning to the creek to spawn may be reduced by comparison with those of resident juveniles, and whole body concentrations measured for steelhead are not usually high enough to be expected to have an adverse toxicological effect on non-reproductive adult fish (Birge et al. 1979).

D.2.2.5 Response to Comment 1-5

Proposed procedures for handling soil and sediments excavated during construction are detailed in the project Soil Management Plan, which is described in Chapter 2 of the EIR/EIS. Soil excavated during construction will be stockpiled at designated onsite locations above the elevation of the 3-year floodplain, and tested for mercury and other contaminants in accordance with the provisions of all applicable statutes and regulations pertaining to hazardous wastes. Soils found to contain mercury concentrations in excess of 20 mg/kg (20 ppm) will be disposed of at an appropriately licensed Class I landfill. Soils with mercury content below 20 mg/kg may be reused onsite or disposed of at an appropriate landfill facility. Excavated soils with mercury concentrations between 1 mg/kg and 20 mg/kg (1 ppm and 20 ppm) may be reused onsite, provided they are placed in areas where frequent exposure to surface flow is not anticipated (i.e., above the water surface elevation defined by the 3-year recurrence interval). Soil materials that may be reused onsite to augment planting locations will be stockpiled and tested separately from other excavated material.

The project Engineer's Report addresses the cost of stockpiling, testing, and appropriate disposal of soil and sediment spoils. As specified in the cost estimate for the recommended project (Engineer's Report Appendix D), the net cost associated with the disposal of soil and sediment with mercury concentrations exceeding 20 mg/kg is approximately $2,470,000. The final cost may vary based on results of subsequent testing of the stockpiled material.

D.2.2.6 Response to Comment 1-6

Implementation of the proposed project will not entail any work in tributary regions upstream of the project area; thus, the proposed project will not increase either the volume of storm runoff or the net mercury load delivered to the project reaches of Guadalupe Creek. In the project reaches, the proposed project will widen the active floodplain, but floodplain widening will serve only to offset the reduction in capacity expected to result from the establishment of additional riparian vegetation; the proposed project is designed to maintain rather than increase the flood conveyance capacity of the project reaches of Guadalupe Creek. Thus, neither the mercury load carried by the project reaches nor the ability of the project reaches to convey mercury-bearing floodwaters will increase as a result of project implementation.

Mercury contamination is an issue of concern throughout the Guadalupe River watershed, including the Guadalupe Creek drainage system, and potential solutions to this issue must be developed and implemented on a watershed scale. Master Response 1 describes ongoing cooperative efforts to address this problem. In addition, as described in Chapter 4, the District and the RWQCB will develop and implement a postproject monitoring program that will detect changes in methyl mercury concentrations in the project reaches of Guadalupe Creek and could also play the broader corollary role of serving as an "early warning system" for unrelated events or trends in the upper watershed that could affect mercury transport in the project area.

A long-term maintenance plan for the project area has been added to Chapter 6 of the Engineer's Report.

D.2.2.7 Response to Comment 1-7

Please refer to the response to Comment 1-1.

D.2.2.8 Response to Comment 1-8

The primary objective of the proposed project is to restore SRA cover vegetation and improve aquatic habitat for anadromous fish in the degraded reaches of lower Guadalupe Creek between Almaden Expressway and Masson Dam (see Section 2.3.1.1 of the EIR/EIS). In addition, the project site offers the opportunity to mitigate impacts associated with the Guadalupe River Flood Protection Project within the same watershed. Restoration of a creek located in another region of the Bay Area would not achieve the primary objective of the project, nor would it provide the watershed-specific ecological benefits associated with restoring habitat along Guadalupe Creek.

Selection of the Guadalupe Creek project site was based on a thorough analysis of potential offsite mitigation areas for the Guadalupe River Flood Protection Project in downtown San Jose (Downtown Project). This analysis is discussed in detail in Section 3.4.2.9 of the Downtown Project environmental document (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000).

D.2.2.9 Response to Comment 1-9

Please see Master Response 1 and response to Comment 1-1.

D.2.3 Comments from Patrick Pizzo, 1555 Oak Canyon Drive, San Jose, CA 95120 (December 18, 2000)

Tony Ndah

From: Al Gurevich
Sent: Monday, December 18, 2000 12:27 PM
To: 'kevinm@jsanet.com'; 'BHubbard@spk.usace.army.mil'
Cc: Terry Neudorf; Devin Mody; Tony Ndah; Belinda Allen; Dave Chesterman
Subject: FW: Comments on EIR/EIS Draft Report

More good Pizzo comments to think about

Al

From: Pat Pizzo(SMTP:ppizzo@email.sjsu.edu)
Sent: Monday, December 18, 2000 12:13 PM
To: Al Gurevich
Subject: Comments on EIR/EIS Draft Report

Al Gurevich -

There are a couple of other questions I have about the proposed Guadalupe Restoration Project, Al, and they are as follows:

1- What are "bank stabilization structures"? What do they look like? 2-1

2- What will the boundary be between the excavated wetlands/meadow and the adjacent street on the periphery of the Oak Canyon Development? *One aspect concerns how much of a 'step' in elevation* will exist between the street level and the wetlands/meadow. The second issue concerns any barrier along this periphery. That is, currently there are big boulders making the boundary.... what will *replace these boulders, if anything?* 2-2

3- In the final analysis, after all of the phases of the restoration are completed, how will the public be able to 'enter' the restoration area? What limits will there be on access to all regions of the creek? 2-3

pat pizzo
--

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My web pages:
http://www.engr.sjsu.edu/pizzo, with personal bio and course information
http://www.engr.sjsu.edu/WofMatE, an attempt to make young people more aware of the career opportunities in materials sci & engrg.

Materials Engineering Program at SJSU: http://www.engr.sjsu.edu/cme/materials
Try the Materials Engineering Discussion Board, entry via:
http://www.engr.sjsu.edu/cgi-bin/cme/mate/mate.cgi

D.2.4 Responses to Comments from Patrick Pizzo, 1555 Oak Canyon Drive, San Jose, CA 95120 (December 18, 2000)

D.2.4.1 Response to Comment 2-1

Bank stabilization refers to a wide range of techniques for protecting streambanks from erosion. The proposed project will rely on biotechnical bank stabilization methods (measures that integrate engineering and revegetation methods). Common biotechnical techniques include: joint plantings, rootwads, tree revetments, vegetated gabions, willow stakes, live fascines, erosion control blankets, brush mattresses, and brush layers, as well as bank shaping and planting.

D.2.4.2 Response to Comment 2-2

Please see Master Response 2. The District's proposed Los Capitancillos Freshwater Wetland Mitigation Site Development Project is a separate effort from the Guadalupe Creek Restoration Project. Its environmental impacts will be evaluated, and corresponding mitigation proposed for public review, in a separate environmental document tentatively slated for fall 2001 completion. This document will also address details of project design for the proposed Los Capitancillos freshwater wetlands.

Appendix C of the project Engineer's Report contains a draft set of plans that includes a figure (GEN-17) identifying the boundary between the Guadalupe Creek Restoration Project site and the area that would be encompassed by the proposed Los Capitancillos Freshwater Wetland Mitigation Site Development Project. Because the Guadalupe Creek project area does not include the area adjacent to the Oak Canyon Development, the existing boulders will not be affected by the project.

D.2.4.3 Response to Comment 2-3

Please see Master Response 3.

D.2.5 Comments from Patrick Pizzo, 1555 Oak Canyon Drive, San Jose, CA 95120 (December 20, 2000)

December 20, 2000

Mr. Al Gurevich, Project Manager
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Re: Comments on "Notice of Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS), November '00"

Al Gurevich...

First of all, I thank the Santa Clara Valley Water District Board for holding an open session on December 19th concerning the Guadalupe restoration project. I found the remarks put forward by Dr. Abu-Saba of the California EPA and the exchange between Dr. Gross of the Board and another gentleman (discussing the water-flow requirements to meet cold-water fish needs) most informative; and indicative that the proper concerns and issues regarding mercury contamination are being raised by the many 'partners' involved in the restoration project. Outside the Boardroom at the end of the 'open' discussion, I had further discussion with Dr. Abu-Saba. Based on these discussions I offer the following comments:

1- From Dr. Abu-Saba, I learned that several mercury mitigation steps are concurrently being considered which will have impact on the ability of the Guadalupe Creek Restoration Project to meet environmental requirements consistent with the introduction of cold-water fish and wetlands bird species. For example, he indicated that there are future plans (and I assume appropriate federal funding) to render the mercury tailings in the Quicksilver Park 'stable' with respect to free-mercury leaching. I assume, he is referring to steps similar to those taken to make former smelting and distillation operations regions of the Quicksilver Park in the area of New Almaden safe for hikers and horsemen. This would obviously reduce the amount of free- 3-1 mercury leaching, and subsequent methyl-mercury production, which 'feeds' the Guadalupe Creek in the region between Camden and Almaden Expressway. I know Dr. Abu-Saba is talking about plans which are to be implemented over several years. However, if outlined in the EIS/EIR report, this 'overall' plan may provide sufficient justification to substantiate taking the initial step of restoring the subject region of the Guadalupe Crrek. That is, I think knowledge of the overall steps being taken to deal with mercury contamination from earlier mining operations will give impetus to the specific Guadalupe Creek Restoration Project which is the subject of the draft report. I encourage the Board to insert an appropriate overview into the draft document which will do the following: (1) list current and future planned actions, (2) state intended objective or impact, (3) define the appropriate and/or responsible governmental agency(ies), and (4) present the respective time-line. 3-1 cont'd

2- Now, one other facet of the restoration project I didn't think about before the Monday meeting was the issue of using add-water to help meet the temperature requirements of the cold-water fish population being attracted to the Guadalupe. I now see that this too has a secondary and un-intended function, of carrying methyl-mercury and free-mercury sediment load to the 'downstream' regions of the Guadalupe, and ultimately to the Bay. One gentlemen challenged the Board on the stated water flow targets, and suggested that they may not be conservative (with respect to a healthy steel-head fish population). It would seem that the draft document should make some estimate of the mercury load on the downstream environment for having to use add-water feed near Coleman Avenue to meet temperature requirements: there could be estimates based on before and after comparison of the Phase One Guadalupe Restoration; and additional estimates (reductions) based on the completion of the other planned operations, discussed in Item (1), above. 3-2

3- Lastly, let me relate a story which too was stimulated by the Monday a.m. discussions. My wife son and I visit the Coleman reservoir to fish in 3-3 the summer. For our son Mike, who is learning disabled, it is the challenge of catching a fish which is the attraction. If we ever would catch one (and we have not yet had that pleasure), we would catch and release'. However, on our fishing expeditions, we have encountered people from other cultures who take fishing very seriously. For example, large carp caught become food for their families. We learned this through discussion with the fishermen and with Park Rangers. My point? What liabilities are their to the Board and/or County agencies regarding health problems of people who consume reasonably large amounts of fish from the District controlled and mercury laden waters? I have the sense that I really don't want to know the methy-mercury content of fish tissue from bass and carp and such from the Coleman Lake or the ponds immediately adjacent to the Water District's offices. I cannot but wonder if the County Rangers (?) that manage the Coleman Lake Park should not take a more direct and pro-active role in identifying the problem for people using the lake. Perhaps the "Warning-Contaminated Fish" signs are insufficient?

3-3
cont'd

Let's assume that the County is well into the Restoration project and then this issue of the mercury content of Guadalupe Creek fish becomes an issue. The impact may be that the County must limit access to the Creek and this would be in conflict with the main goal of the project: to provide access of the people of the Santa Clara Valley to fully restored, recreational parklands.

I believe the Water District has to implement a plan which anticipates and properly accounts for human consumption of both warm-water and cold-water fish species removed from the Guadalupe waters. The plan should not be in conflict with free-access of citizens to the creeks, ponds and wetlands so created.

I offer the above comments for consideration of the Board of Directors of the Santa Clara Valley Water District.

Respectfully submitted,

Patrick P. Pizzo
1555 Oak Canyon Drive
San Jose, CA 95120
ppizzo@email.sjsu.edu
408-924-6509

D.2.6 Responses to Comments from Patrick Pizzo, 1555 Oak Canyon Drive, San Jose, CA 95120 (December 20, 2000)

D.2.6.1 Response to Comment 3-1

Please see Master Response 1 for an overview of cooperative regional efforts to address the issue of mercury contamination in the Guadalupe River watershed.

D.2.6.2 Response to Comment 3-2

As described in Section 2.3.1.2 (*Secondary Objectives*), the proposed project has been designed to minimize impacts on existing water management operations and does not include alteration of existing water management practices in the project area. Streamflow augmentation is not incorporated in the proposed project or in any of the project alternatives. Thus, the proposed project will not result in impacts on stream temperature or sediment and mercury loads within and downstream of the project area associated with the use of supplemental water.

The District is a participant in the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE), which was initiated by the District and the California Department of Fish and Game (DFG) to address concerns regarding the District's incremental contribution to cumulative impacts on chinook salmon and steelhead in Santa Clara County's rivers and creeks. Primary goals of the FAHCE program include the establishment of appropriate flow targets and design of flow and non-flow water management strategies to maintain steelhead and chinook salmon populations in the County's natural waterways. Please see Section 5.1.2.5 of the EIR/EIS for a more complete discussion of the FAHCE program.

At this point, the FAHCE program's effects on existing flows in Guadalupe Creek are unknown. However, it is likely that implementation of the FACHE program would result in slight increases in flow in Guadalupe Creek during key fish migration periods or summer low-flow periods. These flow increases are unlikely to result in any adverse impacts in the project area or to reduce the effectiveness of the project design. Instream features that will be installed as a result of the proposed project have been designed to accommodate possible increases in summer base flow under the FAHCE program. Potential environmental impacts associated with increased flows in the project area would be addressed in a separate environmental document prepared for the FAHCE program.

D.2.6.3 Response to Comment 3-3

The primary goals of the Guadalupe Creek Restoration Project are restoration of riparian vegetation and improvement of coldwater anadromous fish habitat. Access to the project area is currently restricted. However, unauthorized recreational use, including fishing, is known to occur, and recent health advisories have indicated that consumption of fish caught in the Guadalupe River watershed, including Guadalupe Creek, may pose a hazard to human health.

Because mercury contamination is recognized as a problem throughout the Guadalupe River watershed, human health risk associated with consumption of fish is considered a preexisting condition: implementation of the proposed project would not result in any new impacts related to fish consumption. However, in order to reduce human health risk associated with consumption of fish under existing conditions, the District will install warning signs at 100-foot intervals on both sides of the creek along the entire project reach, beginning at the entrance to the creek at Almaden Expressway. The signs will state that fish in the area are contaminated and will list the health risks associated with consumption of the fish. In addition, the signs will include the telephone number of the Santa Clara County Department of Health Services so that the public can contact the Department if necessary. Signs will be written in English, Spanish, and Vietnamese in order to address the area's diverse population.

Please see Master Response 3.

D.2.7 Comments Received at the December 19, 2000 Public Hearing

See *4-1* and *4-2* for comments from Patrick Pizzo, 1555 Oak Canyon Drive, San Jose, CA 95120.

Board of Directors Meeting
Public Hearing on Guadalupe Creek Restoration Project
SCVWD (HQ Board Room)
12/19/00

13 Mrs. Laurie Lopatin
Neighbor in the Oakcreek Canyon neighborhood

Mr. Chairman of the board I am actually not representing the neighborhood and would like to get that crossed out. I'm just a neighbor in the neighborhood and I just want to let you know that I support the project itself; and I appreciate that you are trying to address the traffic in the neighborhood and the noise in the neighborhood. There is one aspect that you may not have considered that I wanted to bring up is that Guadalupe School that is right on Coleman Road. In the project itself is says that Coleman is a 4 lane road, however, it is actually only 2 lane road in that area from Meridan over to Camden. And goes right by the Guadalupe School in that area and the heavy truck traffic is supposed to be split between Almaden Expressway and Camden which would take the heavy trucks right by that school, I really support the part in the report that says you are going to try to keep the truck traffic to the non-commute hours, which would be 9 – 4, that would miss the beginning hours of school that occur in the 8:00 to 9:00 hour but it would still take them by that area in the afternoon hours after the school gets out. There is a lot of children that come into our Oakcreek Canyon area and they use the light that's at Redendevin Avenue, crossing on Coleman, and they use some of the lights at Camden as well. So I would urge that you that even if you need to split the trucks that you do that in the morning hours and possibly in the afternoon divert them over to Meridian or to Almaden Expressway, itself; and keep them off the Coleman/Camden stretch. If possible, and tell your drivers to realize that there are small children (kindergartners) that are crossing these roads. I live in the reach 4 area. Our neighborhood is actually in reach 4. There wasn't any comment about whether or not there would be trucks along O'Canyon Drive and Redmond. I am not sure exactly how the trucks are going to be getting into that area for the construction, but if there is driving through our neighborhood we need to know that as well. So if you could in put that when this report is finalized. Then the hours since they will be non-commute hours, the Section 2.4.1.5.11 says that the project will be running from 7 – 5, Monday – Friday, and the truck traffic will be 9 – 4, so it would be nice to mention that your might have people there for 2 hours doing nothing or else they might be there for 2 hours they might be doing something that will meet other needs of the project. I appreciate your trying to work with us in the neighborhood and trying to secure the safety of our children through this. 13-1

10 Keith Anderson
Santa Clara County Streams for Tomorrow

I have a comment to make about the engineer's report and a couple of comments about the project itself. I am not going to be talking about environmental impact report, Linda Jansen in Streams for Tomorrow is our lead in reviewing that if there is a need to provide comment we will do so during the written period. I want to thank the District staff and the consultants for producing a good engineer's report, this is a world different from the July document that you were going to originally adopt in August. It's up to the basic quality that the public learned to expect from the Water District. There is one deficiency in my opinion in the engineer's report; there is no long-term maintenance plan. And in my opinion a long-term maintenance plan is essential to determine if the maintenance will be compatible with the project design. 10-1 Now it has been your standard procedure to produce long-term maintenance plans in the engineer's report, for example, the Adobe Creek project has a very detailed long-term maintenance plan; Upper Guadalupe River Project, long-term plan, even though in both of these projects, there are channel reconstruction, channel remodification, etc., you are still able to define the maintenance needs for the ultimate project. I think you would be able to do that for the Guadalupe Creek Project, so it is a lingering question for me regarding the adequacy of the engineer's report. We do need to know if the eventual long-term maintenance will be compatible with project design. The long-term maintenance plan in essence is a component of project description now we may address that when it comes to the environmental review comments. It has been demonstrated throughout the state that maintenance activities can substantially degrade and devalue the mitigation features, the enhancement features of projects, that has happen. In my experience with the Department Fish & Game, I have observed projects throughout the state, where 10 years after the project completion, the maintenance program devalues, degrades the project by a third or half. There are examples of that happening, so let us hope that is not the case here for Guadalupe Creek. A concern about the project that I have is the project design flow is the current operation now that's basically 3 to 4 CSF of flow released at Mason Dam which gives you percolation and a result of about a half CSF flow at Almaden Expressway. 10-2 Now of course if you go out there and in some of our heat waves in July, August, and September and you look at the stream near Almaden Expressway, it is actually an intermittent flow during those heat waves, it is a very low stream flow. In my opinion, you are missing a great event of opportunity to provide flow augmentation in this enhancement reach. You could take the existing flow operation and use that as a carriage flow to carry an additional 1, 2, or 3 cubic feet per second in here and greatly enhance the steelhead rearing capacity of this stream, because of these flow conditions of the rearing capacity of the rearing potential for steelhead is related to the magnitude of stream flow so you have an opportunity here to really do something good for the steelhead rearing and what is great about it is that this is a regulated stream. You have the ability to capture any water that you release down Guadalupe Creek in the summer at your diversion facilities have down here. So if you were to release an additional 1, 2 or 3 CSF or more, you could capture it at your Alamitos pond diversion facility and utilize that water right outside the back door of this building in this pond so it is not lost to district operations, so you have that opportunity. I am concerned that a decade from now 2 decades from now that there will be a different board here, and there will be other folks standing here and they will be talking about why didn't the Board in 2000 take the opportunity to provide real enhancement out here with stream flows. Then it will be reconsidered in some future date; I'm just concerned that that is going to occur. You are not precluded, but you are designing a project with a design flow of 3 CSF at the upper end and a half CSF below. That design flow is governing some of the placement, location, types of structures, etc. in the low flow channel, if you were to make a decision that you wanted 5 CSF, 7 CSF, etc., you would want your staff to go back and do some fine tuning on the design aspects to enhance and to get the maximum benefit out what you are physically proposing to do in that stream, this is a correlation. I am concerned about water temperatures and the criteria that you are employing, in my opinion, the project's not going to provide acceptable water temperature for steelhead rearing in the lower half of the project reach. Now I know that I am going to be proved right or wrong, decades from now, because we are really not going to know until the SRA vegetation reaches maturity and that is projected up to 40 years from now. So we can legitimately say, it may be 40 years before we can say make the final judgement call, now there is a program of adaptive management during this entire period that I hope will observed some of the problems that could occur far earlier than 40 years. But I have a problem with the basic water temperature criteria; there is no question that the proposal will reduce the water temperatures in this reach of stream and that's good and there is great emphasis on that reduction in the documents that you are looking at, but will it reduce it enough , will it reduce it down to reasonable temperature range for steelhead rearing and my answer to that question is no. Now you are not going to see too much about this issue in this particular document, the engineer's report and the EIR, etc. But if you look at the other reports, and if you look at the Jones & Stokes temperature model, printouts, data, if you look at the mitigation monitoring plan for the downtown project which includes Guadalupe Creek, as a mitigation site, there is enough information already out there for the public to look at to note that we are still going to have a warm water stream at least in the lower half of Guadalupe Creek even after you do all this enhancement work. We are still going to have extreme maximum temperatures in the July, August, September timeframe. We are still going to see temperatures that are going to go up in the high 70's, maybe into the 80's with the project that you are proposing. I am concerned that we are still not going to provide cold water habitat for steelhead, particularly in the lower reach, I am not so concerned about the upper half. I think we will achieve goals of cold water temperature, so if there is a basic concern about temperature criteria the assumptions and conclusions that are being made in reference to temperature. I am also concerned that in the near future we may see the District adopting a different temperature criterion for steelhead reference to the face effort. You are involved in some very complex issues regarding the face effort, the water rights settlement complaints process. You may be adopting adhoc temperature criteria for that process that are basically in conflict with what you are using now to guide a steelhead enhancement project, that's going to create some consternation and problems now if that circumstance were to occur. So I've got concerns about water temperature. My final comment has to do with the fact that this project which is Phase II requires the removal of half of the 1998 Phase I plantings for the SRA vegetation, exactly it is 49%. So Phase II must provide mitigation for removing half of the phase I plantings, to me this illustrates that we had poor planning for this mitigation feature and poor use of public funds. Now I think that is quite upsetting that we have this particular circumstance. And I understand the complexity behind it, the need for the District to implement a Phase I to demonstrate to the downtown collaborative that you were proceeding with projects. What bothers me the most is that some of us raised some yellow flags at the Phase I timeframe. And we were provided assurances that there would be no problem, that there would be no conflict with Phase II

10-3

10-4

10-5

and Phase I, well Phase II removing half of the Phase I SRA plantings is a significant conflict, so those assurances didn't come to fruition for me. Thank you very much. 10-5 cont'd

4 Pat Pizzo

Thank you, Keith, Good morning, my name is Pat Pizzo and I live in Oak Canyon and just representing myself. I have written Al Guervich with my comments regarding the mercury issues and I wasn't sure of what comments I would have coming up here. I was very pleased to see the exchange to just occurred between Mr. Gross and the gentlemen just at the podium regarding mercury and this issue of what's happening with respect to having high values of methyl mercury and free mercury in that restoration area what impact it will have on fish. My concern is that fish are essentially going to look at this as the streams being a source of mercury for the world through the fish, through the migrating fish. 4-1 It concerns me that the origin of the mercury is upstream and we have already had that addressed issue from this gentlemen, I'm sorry I don't know your name, but you addressed that the board is focusing on the mercury issues and I feel pleased to see these expunges and to see the data in the last report. But the conclusion of the last report says that there will be no substantial impact and I tried to look for justification in that, I could not it in the report. You know it is such an important issue that I think the Board has to get substantiation, mainly on the issue of health impact on the human population from the stand point of the build up of mercury in the food chain. 4-2 Again, I am very pleased the exchanges and the interactions going on this issue. One other issue, is with the respect to the soil that you are removing if that has as high mercury levels; do you have to remove that in a certain way such that the more expense to it, then that is indicated in the report or is that included in the report? I'm not, I'm just raising the issue because if it is toxic waste and where are you going to put that stuff? 4-3

16 Libby Lucas

We will be a field trip just to make sure that what the native plants society response on this is go to be. My personal response is that I think considering that you have a 7-year life cycle of the salmon that the temperatures are going to be the critical factor like you have pointed out. Your mitigation planning is not going to be established, so my very unscientific approach would be is there a way since this is such a braided channel to begin with to keep some of the typing that is there like blow meridian, which it is scrubby, but it is highly usable and has very good shade and construct your project to west, southwest of that and then we get enough shade established, then change your grading, your water soil so that it goes into the reconstructed channel, but I think the old channel should be usable at least for those first few years. Otherwise, I'm sure that your 7-year time limit for the fish is going to be too stressful to make anything viable for coming back that maybe-new population, historic populations would not be evident. 16-1 I am one of those people that claim that there has always-historic populations here and the only reason that the Guadalupe and the Napa River have salmon is because they have so much mercury they didn't get eaten. Thank you.

18 Crystal Fritz
Senior at Pioneer High School

Hi my name is Crystal Fritz and I am a senior at Pioneer High School and must excuse me, I have a bit of a head cold. Like I said I am a student at Pioneer High School and we notice in the report that it does not address river alliance, specifically the work done in conjunction with Pioneer High School, The Children's Discovery Museum, and various local elementary schools. This unique and nationally recognized program called Bio Site, or student investigating their environment, meet and spend every Monday and Wednesday on the Guadalupe Creek along Coleman Avenue. High school students used the creek to conduct water quality test, educating the elementary school students on how the Guadalupe Watershed functions and our concern is basically will we still have access to the creek construction? 18-1

D.2.8 Responses to Comments from Patrick Pizzo, 1555 Oak Canyon Drive, San Jose, CA 95120 (December 19, 2000 Public Hearing)

D.2.8.1 Response to Comment 4-1

Please see Master Response 1.

D.2.8.2 Response to Comment 4-2

Please see the response to Comment 3-3.

D.2.8.3 Response to Comment 4-3

Please see the response to Comment 1-5.

D.2.9 Comments from Manuel Rivas, County of Santa Clara, Roads and Airports Department (December 19, 2000)

County of Santa Clara

Roads and Airports Department
Land Development and Permits

101 Skyport Drive
San Jose, California 95110-1302
(408) 573-2460 FAX (408) 441-0275

December 19, 2000

Mr. Al Gurevich
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California. 95118

Subject: Guadalupe Creeck Restoration Project.

Dear Mr. Gurevich

We have reviewed the Environmental Impact Report for the Guadalupe Creeck Restoration Project dated November 22, 2000. Our comments are as follows:

1. Please provide a plan showing access point(s) on Almaden Expressway for the construction traffic. The plan should include a Traffic Control Plan (TCP) which addresses sight distance. It must include mitigation to any identified traffic impact also. 5-1
2. The twelveth item of the secondary project objectives (Page S-4) states: "Not to preclude future recreation uses that are compatible with other project objectves". This item needs to have a specific commitment to accommodate future trail system as shown on County wide Trails System Master Plan. Please clarify. 5-2

If you have any questions, please call me at 408-573-2464.

Sincerely,

Manuel S. Rivas
Project Engineer

Cc: AKC, MA, DEC, JME, File

Board of Supervisors: Donald F. Gage, Blanca Alvarado, Pete McHugh, James T. Beall, Jr. S. Joseph Simitian
County Executive: Richard Wittenberg

D.2.10 Responses to Comments from Manuel Rivas, County of Santa Clara, Roads and Airports Department (December 19, 2000)

D.2.10.1 Response to Comment 5-1

As described in Section **2.4.1.5.9** of the EIR/EIS, the District will require the selected contractor to prepare and implement a traffic safety plan. This plan will address appropriate vehicle size and speed, travel routes, detour and closure plans, flagperson requirements, locations of turnouts to be constructed, and other key factors. Implementation of the plan will be coordinated with appropriate state and local agencies. In addition, the contractor will be required to limit transportation of imported and exported materials to hours outside the peak commute traffic window (9:00 a.m.–4:00 p.m., Monday through Friday).

Appendix C of the Engineer's Report contains a draft set of plans that includes a figure (GEN-1) identifying site access points, staging areas, and haul routes.

D.2.10.2 Response to Comment 5-2

Please see Master Response 3.

D.2.11 Comments from Bill and Sharon Moreland, 5639 Waltrip Lane, San Jose, CA 95118 (December 19, 2000)

Al Gurevich
Santa Clara Water District
5750 Almaden Expressway
San Jose, CA 95118

December 19, 2000

Re: Preliminary Draft of EIR for the Guadalupe Restoration Project

Dear Mr. Gurevich:

I've just completed reading the latest draft of the EIR and engineering report, and I'd like to congratulate you and the team for the excellent job that you did! However , there was one point from my last letter that was not covered:

1) Some methods of "self-protection" should be advertised to the local neighborhoods.. Specific concerns that should be addressed would be air-conditioning units and swimming pools located in area homes and schools. 6-1

   If "self-protection" is not required, that should be stated.

Several new concerns come to mind after reading your new EIR:

1) To ensure that the creek does not become contaminated after the project has been completed, water and soil sampling should be continued until you have ensured no further contamintion is occurring. 6-2
2) Looking at Figure 1b, it appears that all of Waltrip Lane will now be inside the Drainage Basin. If that is correct, will these home owners be required to purchase flood insurance. If so, the city should pay for this new requirement. 6-3

Should you have any questions regarding this letter, you may call me at 266-4398.

Sincerely,

Bill & Sharon Moreland

Bill and Sharon Moreland
5639 Waltrip Lane
San Jose, CA 95118

D.2.12 Responses to Comments from Bill and Sharon Moreland, 5639 Waltrip Lane, San Jose, CA 95118 (December 19, 2000)

D.2.12.1 Response to Comment 6-1

The proposed project includes dust control measures that incorporate the Bay Area Air Quality Management District's guidelines for controlling emissions of inhalable particulate matter (PM10). As described in EIR/EIS Section 4.8.2.2 (*Impact: Mercury-Contaminated Dust Associated with Construction*), analysis shows that, even without dust control measures in place, the ambient air concentration of mercury associated with dust emissions generated by excavation and grading activities on the project site would be substantially less than the EPA's Preliminary Remediation Goal (PRG) for mercury. Implementation of the project's dust control measures will further reduce dust emissions and limit the amount of dust likely to accumulate in neighborhoods surrounding the project site. Therefore, local residents will not need to take self-protection measures.

D.2.12.2 Response to Comment 6-2

Water quality monitoring will continue after implementation of the proposed project; additional baseline monitoring will also take place before construction. Postproject water quality monitoring will continue for a minimum of 5 years after project implementation. Samples will be analyzed for total mercury, dissolved mercury, and unfiltered and filtered methyl mercury as well as suspended solids, pH, temperature, dissolved oxygen, and dissolved organic carbon. If large changes in water turbidity are evident, samples of suspended solids will be taken and pH and temperature will be measured to characterize the full depth cross section of the creek. Details of the proposed postproject water quality monitoring program are presented in Chapter 4 of the EIR/EIS.

Soil sampling in the project reaches will not continue after project implementation. Implementation of the proposed project will not involve any work in tributary regions upstream of the project area. The proposed project will not affect the volume of storm runoff or the net sediment load delivered to the project reaches of Guadalupe Creek, and should have no impact on mercury content of bank and instream soils and sediments.

Soil sampling in upstream areas may be implemented as part of regional or watershed-level efforts to address mercury issues in the Guadalupe River watershed. Please refer to Master Response 1 for a description of these programs.

D.2.12.3 Response to Comment 6-3

Waltrip Lane is located within the Guadalupe Creek watershed (drainage basin). However, it is outside the Flood Hazard Zone defined by the Federal Emergency Management Agency (FEMA) (by an elevation of 1 foot or more), and outside FEMA's 1% flood limit (by less than 1 foot of elevation). Waltrip Lane residents thus will not need to purchase flood insurance.

D.2.13 Comments from Michael S. Asahina, San Jose Water Company (December 20, 2000)

San Jose
Water
Company

374 West Santa Clara St.
San Jose, CA 95196-0001
Phone 408 279-7800
Fax 408 279-7934

December 20, 2000

Al Gurevi
Project Manager
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: Draft EIR/EIS
Guadalupe Creek Restoration Project,
San Jose, California

Dear Mr. Gurevi:

The San Jose Water Company (SJWC) has reviewed the Draft EIR/EIS. The SJWC has a 16" main crossing Guadalupe Creek under the Meridian Avenue Bridge. The scope of this project as described in the Draft EIR/EIS does not appear to affect any SJWC facilities. 7-1

Please send me a copy of the public comments made on the Draft EIR/EIS when they become available. 7-2

Thank you.

Sincerely yours,

Michael S. Asahina, P.E.
Planning Supervisor

cc: To File
Rich Pardini, SJWC
Craig Giordano, SJWC
Jerry Brown, SJWC
Mike McQueen, SJWC

D.2.14 Responses to Comments from Michael S. Asahina, San Jose Water Company (December 20, 2000)

D.2.14.1 Response to Comment 7-1

Comment noted.

D.2.14.2 Response to Comment 7-2

Comment noted.

D.2.15 Comments from Kathleen Muller, Guadalupe River Parks and Gardens (December 27, 2000)

GUADALUPE
RIVER PARK & GARDENS

December 27, 2000

Al Gurevich
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

RE: Guadalupe Creek Restoration Project

Dear Al,

Please accept these comments on the Draft EIR/EIS for the Guadalupe Creek Restoration Project, on behalf of the Board of Directors of the Guadalupe River Park & Gardens Corporation.

We are very pleased that this project is moving forward with the objective of restoring shaded riverine aquatic habitat in the Creek, and that this may provide offsite mitigation credit for the Downtown Guadalupe Project.

An additional aspect of the project that is of great importance to us is the inclusion of recreational elements, specifically hiking/biking trails, in the design and implementation. While the project description states that it will "not preclude future recreation uses that are compatible with other project objectives", we would like a more active inclusion of trails in the plan. 8-1

As proponents of the Downtown Guadalupe Project, primarily, we hope to see a continuous system of trails linking the Guadalupe River Park south to the Almaden Valley, as well as west to Los Gatos, as soon as possible. By including the trails in restoration projects such as this, the Santa Clara Valley Water District will be providing a tremendous additional benefit to the citizens of this region.

Thank you for the opportunity to offer these comments.

Sincerely,

Kathy

Kathleen Muller
Executive Director

cc: Dave Chesterman

2000 Board of Directors
Jim Towery
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Martin Gothberg
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Suzanne Wolf
Ken Yeager

Council of Advisors
Gloria Duffy
Jerry Estruth
David Pandori

Executive Director
Kathleen Muller

www.grpg.org

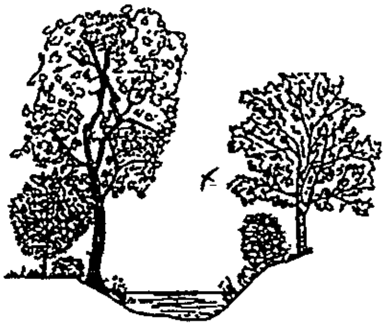
D.2.16 Response to Comment from Kathleen Muller, Guadalupe River Parks and Gardens (December 27, 2000)

D.2.16.1 Response to Comment 8-1

Please see Master Response 3.

D.2.17 Comments from Keith Anderson, Streams for Tomorrow (January 8, 2001)

SANTA CLARA COUNTY
STREAMS FOR TOMORROW
Post Office Box 1409
San Martin, California 95046



January 8, 2001

HAND DELIVERED

Mr. Al Gurevich
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Dear Mr. Gurevich:

Guadalupe Creek Restoration Project
From Almaden Expressway to Masson Dam;
Draft Environmental Impact Report/Environmental Impact Statement

We have the following comments on the subject Draft Environmental Impact Report/ Environmental Impact Statement (Draft EIR/EIS) for your consideration.

1. Dewatering the project reach of Guadalupe Creek may strand juvenile steelhead trout using the stream as rearing habitat or migrating through the project area on their outmigration to the San Francisco Bay/Pacific Ocean. The Draft EIR/EIS recognizes that there is the potential to strand juvenile anadromous fish (Section 4.2.2.3.1), and proposes Best Management Practices (BMPs) in the project description to reduce this potential adverse impact to a less-than-significant level (Section 2.4.1.5.5). 9-1

The subject BMP states: "The District, NMFS, and DFG will cooperate to develop a method and protocol for capture and relocation of stranded fish." It is our understanding that the subject method and protocol will be regulated by (and therefore in compliance with) the Terms and Conditions Number 3A through 3D of the August 11, 2000 National Marine Fisheries Service Biological Opinion for the Guadalupe River Flood Control Project. We seek confirmation of this understanding.

2. The Draft EIR/EIS recognizes that there is the potential to impede the upstream migration of adult Chinook salmon during the construction season (Section 4.2.2.3.1), and proposes a BMP (final bullet in 2.4.1.5.5) to reduce this potential adverse impact to a less-than-significant level. However, the description of the subject BMP fails to provide sufficient information to make a reasonable determination that the potential impact will be reduced to the desired less-than-significant level. 9-2

From our perspective, we identify the intent of the subject BMP - providing for the unimpeded upstream migration of adult Chinook salmon on their spawning run - as an essential project mitigation measure. Impeding salmon migration passage would be a significant adverse environmental impact.

The National Marine Fisheries Service recognized the importance of providing uninterrupted passage for *Chinook salmon in their August 11, 2000 tentative "Essential Fish Habitat* Conservation Recommendations" for the Guadalupe River Flood Control Project, prepared pursuant to the Magnuson-Stevens Fishery Conservation and Management Act.

Conservation Recommendation Term and Condition Number 1.B states: "The Corps and the SCVWD should ensure and maintain a corridor for unimpeded passage of chinook during construction of the project action."

The subject BMP states: "The determination of the need to provide passage will be based on the occurrence of more than 25 adult chinook salmon, on flow conditions, and on a cooperative assessment of passage needs by the District, NMFS, and DFG." No explanation nor justification is provided as to why 25 salmon must be counted or captured at some unidentified downstream site before upstream passage through or around the construction area is provided. Holding fish until an arbitrary total (25) is satisfied constitutes impeding their upstream migration. Delaying salmon migration by trapping and holding them in marginal September - October Guadalupe River habitat conditions may adversely affect the health of individual fish and the viability of any subsequent spawn from them. Impeding migration may stimulate spawning in marginal, undesirable habitats and locations. Artificial impediments to Chinook salmon spawning migrations must be avoided. 9-3

The determination parameter of "flow conditions" is undefined. If streamflow conditions are sufficient to allow adult salmon to reach the downstream end of the project area (mouth of Guadalupe Creek), then unimpeded passage through or around the project area should be provided. To ensure sufficient flow to sustain any salmon relocated upstream from the project, the District could manage flows between Guadalupe Dam and Masson Dam during this short fall period to benefit the fish. Such action would be within the control of the District.

The subject BMP further states: "The determination that adult chinook salmon are present will be based on trapping at an appropriate downstream location or on an appropriate alternative method developed cooperatively by the District, NMFS, and DFG." This description is insufficient to determine the feasibility, effectiveness, and appropriateness of the proposal. Trapping and holding adult salmon at some downstream site may, in itself, cause injury and/or death to these fish, a California Species of Special Concern. The proposed BMP may cause a significant environmental impact. The reference to the District, NMFS, and DFG cooperatively developing an "alternative method" constitutes deferring the formulation of a mitigation measure to some future date, an action which is unlawful pursuant to the California Environmental Quality Act (CEQA) and case law.

9-4

In summary, we believe providing unimpeded passage for adult Chinook salmon through or around the work area is an essential project mitigation obligation. Unfortunately, the BMP presented in the Draft EIR/EIS fails to provide sufficient information for decisionmakers and the public to make a determination as to whether the potential adverse impacts associated with impeding salmon migration will be mitigated to a less-than-significant level. The measure as presented is inadequate, incomplete, and, in our opinion, constitutes an unlawful deferment of the formulation of an essential mitigation measure. The Final EIR/EIS must address this deficiency by presenting a specific, feasible and effective BMP/mitigation.

Thank you for the opportunity to comment. If you have questions regarding our comments, please contact me at the letterhead address or telephone (408) 683-4330 (voice and fax).

Sincerely,

Keith R. Anderson

Keith R. Anderson
Environmental Advocate

D.2.18 Responses to Comments from Keith Anderson, Streams for Tomorrow (January 8, 2001)

D.2.18.1 Response to Comment 9-1

The project will comply with Terms and Conditions Numbers 3A through 3D of the August 11, 2000 National Marine Fisheries Service (NMFS) Biological Opinion (BO) for the Guadalupe River Flood Control Project in downtown San Jose. Stream and fisheries resources will be monitored prior to construction, and all dewatering and fish relocation activities will be supervised, by a qualified fisheries biologist. Best management practices (BMPs) for the Guadalupe Creek Restoration Project (including the Construction Area Fish Management Measures) were designed to be consistent with those in place for the Guadalupe River Project in downtown San Jose.

D.2.18.2 Response to Comment 9-2

The subject BMP has been revised to include the following text:

> "Determination of the need to provide upstream passage will be based on the occurrence of adult chinook salmon at the downstream end of the project area. A fish trap will be placed in an appropriate location, chosen in coordination with DFG and NMFS, and operated by a qualified fisheries biologist. In order to maintain fish in good condition, all migrating chinook salmon will be removed from the trap every 24 hours, or at an appropriate time interval, as determined by a qualified fisheries biologist. Captured fish will be counted, measured, and transported immediately to a flowing creek segment that allows upstream migration. Additional details of upstream migrant trapping, including specific reporting requirements, will be coordinated with DFG and NMFS."

D.2.18.3 Response to Comment 9-3

Please see the response to Comment 9-2.

D.2.18.4 Response to Comment 9-4

Please see the response to Comment 9-2.

D.2.19 Comments from Keith Anderson, Streams for Tomorrow (December 19, 2000 Public Hearing)

Please see *10-1*, *10-2*, *10-3*, *10-4*, and *10-5* in the transcript of public hearing comments that begins on page D-22.

D.2.20 Responses to Comments from Keith Anderson, Streams for Tomorrow (December 19, 2000 Public Hearing)

D.2.20.1 Response to Comment 10-1

The Engineer's Report has been revised to include a long-term maintenance plan (see Engineer's Report Chapter 6).

D.2.20.2 Response to Comment 10-2

Comment noted.

As described in Section 2.3.1.2 (*Secondary Objectives*), the proposed project has been designed to minimize impacts on existing water management operations and does not include alteration of existing water management practices in the project area. Streamflow augmentation is not incorporated in the proposed project or in any of the project alternatives. However, the proposed project does provide for narrowing the active low-flow channel, which will deepen the water column at all flows.

In addition, the District is a participant in the FAHCE program, which was initiated by the District and DFG to address concerns regarding the District's incremental contribution to cumulative impacts on chinook salmon and steelhead in Santa Clara County's rivers and creeks. Primary goals of the FAHCE program include the establishment of appropriate flow targets and design of flow and non-flow water management strategies to maintain steelhead and chinook salmon populations in the County's natural waterways. Please see Section 5.1.2.5 of the EIR/EIS for a more complete discussion of the FAHCE program.

Instream features that will be installed as a result of the proposed project have been designed to accommodate possible increases in summer base flow under the FAHCE program

D.2.20.3 Response to Comment 10-3

Implementation of the Guadalupe Creek Restoration Project is not expected to provide optimal conditions for steelhead or chinook salmon, but there is every reason to expect that it will improve habitat substantially as compared to existing conditions. Under existing conditions, temperatures in the lowest reach of the project area are suboptimal to lethal during the summer months. Based on the Biological Data Report on steelhead and chinook prepared for the Guadalupe River Project in downtown San Jose (U.S. Army Corps of Engineers 2000a), postmitigation average maximum temperatures in lower Guadalupe Creek are expected to drop below the lethal threshold for chinook salmon during the critical summer months. Postmitigation average maximum monthly temperatures for all of the project reaches of Guadalupe Creek are expected to be 5.5° F lower than preproject temperatures during August of the dry/median year. In isolated areas within the project reaches, average maximum April temperatures are expected to show a postproject decrease of as much as 7.6° F, and average April temperatures are expected to decrease by as much as 3.9° F.

D.2.20.4 Response to Comment 10-4

The temperature criteria used in this EIR/EIS to determine habitat suitability for steelhead and chinook salmon are drawn from a variety of widely accepted scientific literature (Shapovalov and Taft 1954; Moyle 1976; Raleigh et al. 1984, 1986; Rich 1987) and are recognized by NMFS and the USFWS as standard thresholds. The same criteria were used in the water temperature modeling and habitat evaluation procedures (HEP) analysis conducted for the Guadalupe River Flood Protection Project in downtown San Jose and were used to set the Guadalupe Creek Restoration Project water temperature objectives established in the Mitigation and Monitoring Plan for the Downtown Project (Volume 2, Appendix 3 in U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). Implementation of the FAHCE program may result in increased summer base flow, potentially reducing water temperatures and increasing the suitability of rearing habitat for anadromous fish in the project area. However, this will not change the temperature criteria adopted for the proposed project.

D.2.20.5 Response to Comment 10-5

The proposed project incorporates BMPs to safeguard existing vegetation during construction (see *Vegetation Protection Measures* in Chapter 2 of the EIR/EIS). In addition, as described in EIR/EIS Section 4.2.2.9 (*Impact: Loss of Phase 1 Plantings as a Result of Construction*), Phase 1 plantings located in construction areas will be removed before construction activities begin and will be replanted in the Phase 1 area during the planting phase of the proposed project. Any Phase 1 plantings adversely affected during transplanting activities as a result of the proposed project will be replaced onsite at a 1:1 ratio. Replacement plantings will consist of in-kind species from locally native genetic stock. Thus, the proposed project will not result in permanent loss of Phase 1 plantings.

D.2.21 Comment from Ray Molseed, Valley Transportation Authority (January 8, 2001)

VTA. SANTA CLARA
Valley Transportation Authority

January 8, 2001

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

Attention: Mr. Al Gurevich, Project Manager

Subject: Guadalupe Creek Restoration Project, Draft EIR/EIS

Dear Mr. Gurevich:

Santa Clara Valley Transportation Authority (VTA) staff have reviewed the Draft Environmental Impact Report / Statement (DEIR/S) for the Guadalupe Creek Restoration Project from Almaden Expressway to Masson Dam. We have the following comments.

VTA's Bus Line 350 operates on Coleman Road, adjacent to the project area. VTA's Bus Lines 63 and 64 operate on Meridian Avenue and Almaden Expressway, respectively, roadways which cross the project area. On Page 2-16, the DEIR/S identifies measures to address traffic-related effects of the project. The section states that "The District will require the selected contractor to prepare and implement a traffic safety plan." Please include VTA staff in the process to review and approve the traffic safety plan so the project activities can be coordinated with bus operations. Please forward the traffic safety plan to VTA for review and comment. 11-1

We appreciate the opportunity to review this project. If you have any questions, please call Lauren Bobadilla of my staff at (408) 321-5776.

Sincerely,

Roy Molseed
Senior Environmental Analyst

RM:LGB:kh

D.2.22 Response to Comment from Ray Molseed, Valley Transportation Authority (January 8, 2001)

D.2.22.1 Response to Comment 11-1

Comment noted.

D.2.23 Comments from M. J. Lopatin, 1547 Oak Canyon Drive, San Jose, CA 95120 (January 8, 2001)

From: <Lopatin@aol.com>
To: <agurevich@scvwd.dst.ca.us>
Date: 1/8/01 5:05PM
Subject: Draft EIR public comment on Guadalupe Creek Restoration project

Mr. Gurvich,

In addition to my remarks at the public hearing in December about traffic on Coleman by Guadalupe School and making sure trucks do not travel through the Oak Canyon neighborhood to get to Reach 4, I would like to see the following issues addressed in the Final EIR as part of the public comment process, if possible:

1) Safety and Fencing

The Reach 4 area of the project is easily accessible to children, and from there the other reaches. The children only have to climb over some 1-foot-high boulders (there are no fences from the Oak Creek Canyon neighborhood side of the project) and their natural curiosity could easily put them in danger with the heavy equipment. I would like to see this appear as a safety concern in the report. I'm sure it can be addressed with extensive fencing. 12-1

2) In addition to waiting until non-commute hours to start the heavy truck traffic, there was a comment in the Draft EIR that, due to the relatively high noise levels (over 60 db at 1000 feet), there would also be a delayed start to using the heavy equipment still on the site. I would like to see something specific in the Final EIR specifying these hours in the contracts let out, and who in the Water District can be contacted by the neighbors if these hours are violated. 12-2

Thank you for your help with this.

– MJ Lopatin
1547 Oak Canyon Dr.
San Jose, CA 95120

D.2.24 Responses to Comments from M. J. Lopatin, 1547 Oak Canyon Drive, San Jose, CA 95120 (January 8, 2001)

D.2.24.1 Response to Comment 12-1

Chain-link fencing will be installed on the Los Capitancillos site along Oak Canyon Road to restrict access to the project site.

D.2.24.2 Response to Comment 12-2

The contract documents prepared for project construction will incorporate the BMPs specified in the EIR/EIS, including those that pertain to heavy equipment operation (see *Best Management Practices* section in Chapter 2 of the EIR/EIS). The project BMPs specify that construction activities will take place from 7:00 a.m. to 5:00 p.m., Monday through Friday. In addition, the contractor will be required to limit transportation of imported and exported materials to hours outside the peak commute traffic window (9:00 a.m.–4:00 p.m., Monday through Friday). Signs identifying a Santa Clara Valley Water District contact person and telephone number will be posted along the boundaries of the project site.

D.2.25 Comment from Laurie Lopatin, 1547 Oak Canyon Drive, San Jose, CA 95120 (December 19, 2000 Public Hearing)

Please see *13-1* in the transcript of public hearing comments that begins on page D-22.

D.2.26 Response to Comment from Laurie Lopatin, 1547 Oak Canyon Drive, San Jose, CA 95120 (December 19, 2000 Public Hearing)

D.2.26.1 Response to Comment 13-1

Access to the site will be limited to Almaden Expressway and Singletree Way via Blossom Hill Road to prevent construction traffic from entering adjacent residential neighborhoods. Traffic related to normal construction activities will enter and exit the site from the Meridian Avenue Bridge and Almaden Expressway. There will be no heavy equipment traffic on Coleman Road west of the Meridian Avenue Bridge. Thus, construction traffic will not be routed near Guadalupe School.

D.2.27 Comment from Jane Mark, County of Santa Clara, Parks and Recreation Department (January 8, 2001)

County of Santa Clara

Environmental Resources Agency
Parks and Recreation Department

298 Garden Hill Drive
Los Gatos, California 95032-7669
(408) 358-3741 FAX 358-3245
Reservations (408) 358-3751 TDD (408) 356-7146

January 8, 2001

Mr. Al Gurevich, Project Manager
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

SUBJECT: Guadalupe Creek Restoration Project from Almaden Expressway to Masson Dam – Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS)

Dear Mr. Gurevich:

The Santa Clara County Parks & Recreation Department is in receipt of the Notice of Draft Environmental Impact Report/Environmental Impact Statement (DEIR/DEIS) for the *Guadalupe Creek Restoration Project.* We are focused on how the subject project may potentially impact our recreational trails and parks within and adjacent the Guadalupe Creek project location.

As noted on page 3-39 of the ***Public Access, Parks and Recreation*** section (§3.10.3) of the DEIR/DEIS, the Guadalupe Sub-regional Trail, a multi-use recreational and commuter trail designated in both the County and City of San Jose's trails plans and proposed along the full length of the SCVWD riparian corridor from Highway 237 to the Guadalupe Reservoir, will provide significant regional trail connections throughout our County. Although the Santa Clara Valley Water District (the District) mentions no future plans for implementing recreational trails within this approximate 2.0 mile-portion of the subject corridor, the County Parks and Recreation Department highly recommends that the District incorporate the provision of recreational trails within this portion of the Guadalupe Creek, as they have successfully done so in the Guadalupe River Project of Downtown San Jose. As a result of successful interagency collaborations and joint use agreements with the District, the County Parks and Recreation Department has been able to implement the proposed regional trail system of our *Santa Clara County Countywide Trails Master Plan Update*, adopted in 1995 by the County Board of Supervisors. We hope that this project will provide such opportunity for creating more recreational uses for future generations.

14-1

The County Parks Department appreciates the opportunity to respond to the DEIR for the Guadalupe Creek Restoration Project. If you have any questions regarding the above noted comments, please contact me at (408) 358-3741 x152 or via EMAIL at Jane.mark@mail.prk.co.santa-clara.ca.us.

Sincerely,

Jane Mark
PARK PLANNER

CC: Mark Frederick, Planning and Development Manager

s:\projects\plan_development\j. mark\staff eir comments\scvwd guad creek restoration 1.8.01.doc

D.2.28 Response to Comment from Jane Mark, County of Santa Clara, Parks and Recreation Department (January 8, 2001)

D.2.28.1 Response to Comment 14-1

Please see Master Response 3.

D.2.29 Comments from Libby Lucas, 174 Yerba Santa Avenue, Los Altos, CA 94022
(January 8, 2001)

Subj: Guadalupe Creek Restoration Project Draft EIR/EIS
Date: 01-01-08 18:48:10 EST
From: JLucas1099
To: algurevi@scwwd.dst.ca.us

Guadalupe Creek Restoration Project Draft EIR/EIS, jointly prepared by the Santa Clara Valley Water District and U.S. Army Corps of Engineers, Sacramento District is, in some ways, an impressive detailed design document and in other respects is deficient.

The purpose of the SRA mitigation project on Guadalupe Creek is to compensate for the high loss of riparian corridor and SRA in the three miles of the downtown Guadalupe River Flood Control project, from #880 to #280. As reviewed for the San Jose Guadalupe River Park environmental assessment, the 1985 EIR/EIS of the San Francisco COE flood control project would remove 50% of the riparian corridor while combined with the park plan, 80% of the corridor would be lost, and this is what resulted in the 1991 Sacramento COE modifications to the proposed Federally authorized Guadalupe River project.

The fatal flaw in this 1991 Guadalupe River EA/IS was the omission of the California Department of Fish & Game report of finding 260 salmon redds in 1986 in the project area of the Guadalupe River in downtown San Jose. Instead, the EA/IS mildly states that "Steelhead and Chinook salmon have been observed in the Guadalupe River. Fish habitat in the river, however, for the spawning and rearing of these anadromous species is marginal, primarily due to high water temperatures, low-flow conditions, and sedimentation. The river's steelhead run is thought to be one of the last steelhead runs in the South Bay (NMFS, 1989). The approximate number of salmon and steelhead that migrate up the river to spawn is believed to be small (Fred Nakaji, USFWS)."

This EA/IS goes on to say "The species of wildlife that occur along the river depend upon the riparian vegetative community to provide water, cover, temperature moderation, food supply, and breeding areas. Riparian areas are known to be the most productive of habitats for wildlife. A wildlife census of the project area identified 56 species of birds, including willow flycatchers, and yellow warblers, which are State-listed 'species of special concern' in California. Mammals included opossum, ground and fox squirrels, botta's pocket gopher, muskrat, raccoon, and striped skunk (Harvey and Stanley, 1986)."

This is the rich habitat that has been and will continue to be lost in the downtown Guadalupe River project and that this Guadalupe Creek mitigation was supposed to try to compensate for and yet the conditions of high water temperatures, low-flow conditions and sedimentation appear to make it just as marginal for the spawning and rearing of the anadromous fishery of steelhead and Chinook salmon. To assure this, maybe, in ten to 40 years is not valid mitigation and this is why I find this entire EIR/EIS deficient. 15-1

The return cycle of salmon in this short river species extends, I am told, over seven years. To retain a viable native anadromous fish run demands sustainable conditions for at least a third to a half of that time period of seven years. In the normal weather fluctuations of the region, this is possible, and the resultant flows from the entire watershed did give the lower mainstem Guadalupe River this capability from #880 to #280. The proposed site for mitigation on Guadalupe Creek has different exposure, running east-west rather than north-south, which makes obtaining sufficient shade to cool water temperatures difficult. 15-2

It is stated in the EIR/EIS that flows of 3 to 4 cfs at Masson Dam will result in 0.5 cfs at Almaden Expressway. This is not sustainable flow for incoming 15-3
or outgoing steelhead or salmon. *What will a 10 cfs flow at Masson Dam result in at Alamden Expressway* and the mainstem of the Guadalupe River?
Sustainable flows must be more fully explored in this document. Then, as it is the smell or taste of the home stream waters that brings salmon into the 15-4
right tributary, should the use of imported water be eliminated from Guadalupe Creek? The temperatures of Guadalupe Creek in the Guadalupe Creek
Restoration Project Draft EIR/EIS are not fully evaluated. What are the readings throughout a dry year, normal year and wet year? What months could a 15-5
steelhead or salmon fishery be viable for spawning and for smelts and fingerlings? Is there a program for eliminating the non-native fish in the
Guadalupe Reservoir and river system that would prey on salmon juveniles? What are the recommendations of California Department of Fish & Game? 15-6

From the description of the existing riffles and deep pools of the present Guadalupe Creek it sounds as if it is viable and good fish habitat if the water temperatures were only cooler. Why is it not possible to retain all the riparian cover that now exists, high caliber or not, and create the mitigation SRA scenario elsewhere in this extensive floodplain on an adjacent braided stream to which water is diverted from Masson Dam. To destroy the existing viable fish habitat for a forty-year-out model riparian SRA is not appropriate resource management, and nowhere is it suggested that pallets of mature riparian growth could be dug in at appropriate shade giving locations. The alternatives are incomplete. 15-7

It is acknowledged that the natural meanders of the creek should be evaluated from the Camden Bridge and yet the hydraulic modeling of characteristics for peak flows does not clarify this approach but talks of channel widths only. As my 36 hour review of this EIR/EIS leaves a great deal to be desired, it does not appear that the geomorphology is seriously assessed, but I must request a continuance to study this aspect more fully. 15-8

Another aspect of existing conditions is confusing. It is stated that the depth to water is 8' and yet with the percolation ponds in such close proximity that usually results in a very high neighboring water table that is usually attested to by residents in the area. Why is there this sudden dip in water table in the creek floodplain? This needs further analysis. 15-9

As we were not included in the field trip last week I would request a continuance also until we can walk this project area. There are a number of questions that can only be asked after site observations. The existing riparian trees, and attendant birds and wildlife are prime considerations. Why is it necessary to dig out this area in the manner proposed and where will the mitigation be for the lost habitat? What redesign of the percolation ponds is intended and why cannot they be used to supplement the flows in Guadalupe Creek to make it more feasible for the anadromous fishery? Can shading 15-10 of the ponds be considered, or cooling by artificial means? [illegible]

It is implied that the low water table of 8' has contributed to the riparian tree loss in the project area. Could it be that water diversions to the percolation ponds have deprived the historic Guadalupe Creek channel of sustainable river flows? Can the design of the water resource percolation potential of this creek not be incorporated with a viable riparian corridor? Shouldn't this alternative design be considered in this EIR/EIS? 15-11

The precipitation of the Mt. Umunhum watershed is said to be 40 inches, but I believe that would apply only to the western slopes not the eastern slopes. Is the calculation of runoff supported by historic flow data? What have been the historic flows on Guadalupe Creek? I see the HEC-RAS Hydraulic Output Summary but not the historic gage level flow readings. Afraid I am not doing this five inches of report justice. 15-12

In regards native plants and best management practices: in Table 3-11 Dominant Woody Plant Growth and Reproduction, is mature height of willow at 560' not in error? Effort should be made to eliminate weedy exotic species (non-native) such as vinca, fennel, or cape ivy, so that they will not travel beyond this area. The Ailanthus is particularly invasive and difficult to remove. In a low water table areas use chapparal species as coyote brush, chamise, ceanothus or toyon. 15-13

Plantings 4-8 White alder,Alnus rhombifolia, is subject to damage or death in this area (see Master Gardeners UC Ext. material on this).
p.4-9 Timing of planting is important. Early winter planting, November, December is most successful. 15-14
Slow release fertilizer in hole below plants might help in first season.
p.4-10 Do not water in summer but cover area with heavy 3-4" of chips to mulch new plants. This keeps down weeds the first year. Tree companies deliver free..
All work must be supervised by a competent horticulturist/biologist or the crews will damage existing plants which are to remain! 15-15

These last two paragraphs are the official California Native Plant Society quick review, but we would still appreciate a proper field trip to the project site, with some capability of a continuance for further comment if appropriate.

Also there seems to be some disconnect in the 3.3.4.1 Guadalupe Creek Phase 1 Planting Survey.In the Table 3-12 it appears that thirteen surviving buckeye had good growth at 6.4 feet so deserve some mention, while mule fat and arroyo willow at 2.2' and 2.9' resp. do not guarantee impressive shade potential. 15-16

In Table 5-1 and Table 5-2 there is inconsistency in naming the alternatives 1 and 2 and in designating which is the proposed project. As stated earlier 15-17
there is some inherent confusion as to what wildlife values exist on site and deserve to be retained or mitigated for; what mitigation is realized in Phase I mitigation that needs to be retained or to be supplemented, and what mitigation of linear SRA must be incorporated into the project to mitigate for anticipated losses in the soon to be implemented Guadalupe River flood control project in downtown San Jose. [illegible]

It would appear that Alternative 2 (in the text 5.1.2) is preferable to the proposed project or alternative 1, but the excavation of 31,000 cubic yards of material and importing 11,500 cubic yards of material to create 'suitable planting sites' in an active creek channel is capable of sending heavy sediment loads downstream in early winter storms. 15-19

Please design an alternative that will have a braided meander that will keep at least two thirds of the present viable riffles and pools of Guadalupe 15-20
Creek intact. I believe that this is entirely possible. The sedimentation in the lower, lower Guadalupe River channel, below #101, I can't help but think
was the result of removing the 20 acres of riparian corridor in the Coleman Loop Contract I and 2 and not leaving enough root structure to hold the 12-21
river banks in place. Phase 1 plantings should be retained at all costs.

Sincerely, Libby Lucas, 174 Yerba Santa Ave., Los Altos, CA 94022 jlucas1099@aol.com

Libby Lucas

D.2.30 Responses to Comments from Libby Lucas, 174 Yerba Santa Avenue, Los Altos, CA 94022 (January 8, 2001)

D.2.30.1 Response to Comment 15-1

The proposed project is designed to improve fisheries habitat resources such as spawning gravels, stream temperatures, and hydraulic and habitat diversity. Existing habitat conditions within the project reach are marginal and temperatures commonly exceed lethal thresholds. Designed postproject habitat conditions in Guadalupe Creek will increase shade and narrow and deepen the low-flow channel, improving the existing conditions of fisheries habitat.

D.2.30.2 Response to Comment 15-2

Comment noted. The proposed project involves planting a significant amount of riparian vegetation along the channel banks and installing instream woody material to better define and concentrate flow in the low-flow channel. These features will decrease water temperatures significantly in the lower reaches of the creek.

D.2.30.3 Response to Comment 15-3

As described in EIR/EIS Section 2.3.1.2 (*Secondary Objectives*), the project has been designed to minimize impacts on existing water management operations and does not include alteration of existing water management practices in the project area. Streamflow augmentation is not incorporated in the proposed project or in any of the project alternatives. However, the proposed project does provide for narrowing the active low-flow channel, which will deepen the water column at all flows.

In addition, the District is a participant in the FAHCE program, which was initiated by the District and DFG to address concerns regarding the District's incremental contribution to cumulative impacts on chinook salmon and steelhead in Santa Clara County's rivers and creeks. Primary goals of the FAHCE program include the establishment of appropriate flow targets and design of flow and non-flow water management strategies to maintain steelhead and chinook salmon populations in the County's natural waterways. Please see Section 5.1.2.5 of the EIR/EIS for a more complete discussion of the FAHCE program.

Instream features that will be installed as a result of the proposed project have been designed to accommodate possible increases in summer base flow under the FAHCE program.

D.2.30.4 Response to Comment 15-4

Chinook salmon in the Guadalupe River system, including Guadalupe Creek, are believed to be of San Joaquin River stock. They are drawn to the Guadalupe system by San Joaquin River waters imported to Guadalupe Creek via the Almaden Valley pipeline. Eliminating San Joaquin River add-water from Guadalupe Creek could thus exclude chinook salmon from the Guadalupe system. No change in water management practices will result from implementation of the proposed project.

D.2.30.5 Response to Comment 15-5

As described in Engineer's Report Section 3.4.2.6 (*Water Temperature*), critical limiting water temperature for juvenile steelhead occurs during summer rearing. Data collected in 1996–1997 by the District indicate that summer water temperatures in the project area range from 56° F to 87° F at Almaden Expressway and 55° F to 71° F at Masson Dam. Based on the Biological Data Report on steelhead and chinook prepared for the Guadalupe River Project in downtown San Jose (U.S. Army Corps of Engineers 2000a), postmitigation average maximum temperatures in lower Guadalupe Creek are expected to drop below the lethal threshold for chinook salmon during the critical summer months. Post-mitigation average maximum monthly temperatures for all of the project reaches of Guadalupe Creek reach are expected to be 5.5° F lower than preproject temperatures during August of the dry/median year. In isolated areas within the project reaches, average maximum April temperatures are expected to show a postproject decrease of as much as 7.6° F, and average April temperatures are expected to decrease by as much as 3.9° F.

It is not anticipated that the project will create spawning habitat for steelhead or chinook salmon.

D.2.30.6 Response to Comment 15-6

The proposed project does not incorporate a program for eradication of non-native fish species in the project area or in other waters of the region.

D.2.30.7 Response to Comment 15-7

Existing conditions for anadromous fish in Guadalupe Creek are marginal at best. Riparian vegetation is sparse in the lower reaches of the project area, resulting in stream temperatures that are often suboptimal to lethal during the critical summer rearing months. The proposed project is designed to substantially increase the amount of SRA cover vegetation and improve instream aquatic habitat within the project area. In addition, as described in EIR/EIS Section 2.3.1.2, one of the project's secondary objectives is to minimize impacts on existing resources. The majority of the existing riparian vegetation in the project area will not be affected by the project.

The suggested alternative is not feasible because sufficient mature native riparian trees are not available for importation.

D.2.30.8 Response to Comment 15-8

As described in Engineer's Report Section 3.1.1, the geomorphology of the entire Guadalupe Creek Basin, including the upstream segment below Camden Bridge, was evaluated as background for the project. However, because the upstream segment is not included in the project area, the hydraulic analysis was limited to the area between Almaden Expressway and Masson Dam.

D.2.30.9 Response to Comment 15-9

Based on measurements taken in soil test pits located within the project area, depth to groundwater in the floodplain is more heavily influenced by surface water levels in the creek than by the adjacent percolation pond system. In most of the project area, data indicate that groundwater elevations decrease significantly relative to surface-water elevations with increased distance from the main channel. This gradient is especially steep in Reaches 1 and 2, which are bordered by the lower ponds of the percolation pond system.

D.2.30.10 Response to Comment 15-10

The proposed project is designed to substantially increase the amount of SRA cover vegetation and improve instream aquatic habitat within the project area. This requires grading and recontouring the existing steep banks and higher flooplain terraces to create low-level floodplain terraces that are closer to the elevations of existing surface- and groundwaters.

As described in EIR/EIS Section 2.3.1.2 (*Secondary Objectives*), one of the proposed project's secondary objectives is to minimize impacts on existing resources. The majority of the existing riparian vegetation in the project area remain unaffected by the project. Table 2-2 in the EIR/EIS shows impacts on existing vegetation (linear feet and acres), including Phase 1 plantings, expected to result from implementation of the proposed project. This table also includes the associated mitigation requirements and the net planting area. Impacts on existing vegetation will be mitigated onsite.

In addition, the proposed project was designed to minimize impacts on existing water management operations (see EIR/EIS Section 2.3.1.2). Thus, it must entail only minor modifications to the percolation pond system. An alternative involving significant modifications to the percolation pond system was not considered because it would not meet project objectives with regard to minimizing impacts on existing water management.

D.2.30.11 Response to Comment 15-11

A comparison of historic aerial photographs, including photographs that predate construction of the percolation ponds (see Engineer's Report Section 3.3, *Historic Vegetation*), shows that the tree canopy along the channel in the project area has remained relatively constant over the last 60 years. Most changes in tree canopy during that period have been the result of direct disturbance related to gravel mining activities and construction of bridges and percolation ponds.

In addition, the proposed project was designed to minimize impacts on existing water management operations (see EIR/EIS Section 2.3.1.2). Thus, it must entail only minor modifications to the percolation pond system. An alternative involving significant modifications to the percolation pond system was not considered because it would not meet project objectives with regard to minimizing impacts on existing water management.

D.2.30.12 Response to Comment 15-12

Comment noted. Data regarding historic flows in Guadalupe Creek were reviewed as background information for the project. This information, including historic annual peak discharges recorded at Streamflow Gage 43 (located 0.5 mile upstream of Camden Avenue), is summarized in Engineer's Report Section 3.1.2 (*Hydrology*).

D.2.30.13 Response to Comment 15-13

Table 3-11 has been revised to reflect this comment.

Exotic species such as Himalayan blackberry (*Rubus discolor*) and fennel (*Foeniculum vulgare*) will be removed from the site during excavation and grading activities.

D.2.30.14 Response to Comment 15-14

Comment noted. Planting will occur in fall to ensure optimal conditions for plant establishment. Plantings will require irrigation during the establishment period because of the depth to groundwater on the project site and harsh summer conditions in the area. Plantings will be mulched to help retain moisture and reduce weed growth.

D.2.30.15 Response to Comment 15-15

As described in EIR/EIS Section 2.4.1.5.1 (*Vegetation Protection Measures*), plastic barrier fencing will be erected or similar measures will be implemented to protect existing vegetation within the construction area. The project contract documents will specify the type of protective fencing to be used. They will also stipulate substantial penalties for damaging existing vegetation.

D.2.30.16 Response to Comment 15-16

The discussion in EIR/EIS Section 3.3.4.1 refers to the number of species that have survived the first year, not to vegetation height.

D.2.30.17 Response to Comment 15-17

Table 5-1 has been revised based on this comment.

D.2.30.18 Response to Comment 15-18

As described in EIR/EIS Section 1.1 (*Purpose and Need for the Proposed Project*), approximately 5,971 linear feet of SRA vegetation planted along Guadalupe Creek under the proposed project may serve as offsite mitigation for impacts of the Guadalupe River Flood Protection Project in downtown San Jose.

Table 2-2 in the EIR/EIS shows impacts on existing vegetation (linear feet and acres), including Phase 1 plantings, expected to result from implementation of the proposed project. This table also includes the associated mitigation requirements and the net planting area.

D.2.30.19 Response to Comment 15-19

As shown in EIR/EIS Tables 2-1 and 2-2, the proposed project provides greater additional benefits and will result in the establishment of substantially more SRA cover and riparian vegetation than either of the two alternatives.

Planting riparian vegetation and implementing erosion control measures (as described in EIR/EIS Section 2.4.1.5.2) will effectively stabilize newly excavated and filled surfaces, preventing erosion and downstream transport of soil and sediment.

D.2.30.20 Response to Comment 15-20

An alternative that includes maintaining the existing braided stream channel in the lower reach of the project area would not meet the primary project objective of creating and maintaining suitable water temperatures for anadromous fish. Braided channels tend to have higher water temperatures because they are typically shallow and wide, and thus have a greater surface area than a more confined channel carrying the same flow volume. Narrowing the low-flow channel as proposed will increase depth and contribute to lowered water temperatures.

The proposed project maintains most of the existing instream aquatic habitat. Areas for which channel realignment is proposed consist predominantly of runs, which offer limited habitat value.

D.2.30.21 Response to Comment 15-21

Comment noted. Planting riparian vegetation, implementing erosion control measures (as described in EIR/EIS Section 2.4.1.5.2, *Erosion and Sediment Control Measures*), and installing bank stabilization and protection structures will effectively stabilize newly excavated surfaces and prevent downstream transport of eroded material.

D.2.31 Comment from Libby Lucas, 174 Yerba Santa Avenue, Los Altos, CA 94022 (December 19, 2000 Public Hearing)

Please see *16-1* in the transcript of public hearing comments that begins on page D-22.

D.2.32 Response to Comment from Libby Lucas, 174 Yerba Santa Avenue, Los Altos, CA 94022 (December 19, 2000 Public Hearing)

D.2.32.1 Response to Comment 16-1

The majority of the existing riparian vegetation on the project site will be maintained to provide cover during the establishment period for restoration plantings. In addition, fast-growing species such as willows (*Salix* spp.) will be planted at the water's edge to provide shade and reduce water temperatures within the first few years after project construction.

In addition, braided channels tend to have higher water temperatures because they are typically shallow and wide, and thus have a greater surface area than a more confined channel carrying the same flow volume. Narrowing the low-flow channel as proposed will increase depth and contribute to lowered water temperatures.

D.2.33 Comments from Libby Lucas, 174 Yerba Santa Avenue, Los Altos, CA 94022 (January 22, 2001)

January 22, 2001

Alberto M. Gurevich, Senior Project Manager
Guadalupe Creek Restoration Project
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118-3686

RE GUADALUPE CREEK
SRA MITIGATION EIR/EIS
SUBSEQUENT COMMENTS ON SITE:

Dear Alberto Gurevich,

Regrettably, I was not able to reach the majority of the project area when I walked it last week. There seems to be considerable late alteration of the project from an initial public workshop, if I am remembering properly. It appears now that there will continue to be operation of the entire field of percolation ponds and so the concept of recreation trails with considerable buffer to the riparian corridor is no longer feasible? 17-1

I am still very concerned about the loss of present mature vegetation, with its attendant loss of shade and cooling of temperatures in this very exposed river system. Therefore I urge you to consider the following approach to terracing. Mitigation planting should not be allowed to remove any degree of existing SRA. ~~or else~~ It must compensate for it in full according to Fish & Game standards. (I meant to enclose a sketch but time does not permit) p.2 17-2

In Reach 4, as the imported water may be used for the percolation ponds, an alternate stream could be channeled to the south-eastern side of the Creek, to water the mitigation branch of Guadalupe that would be excavated safely in the shade of the sycamores but so as to not impact their root system. It would be at an elevated level to the present incised channel but midway to the present height of the terrace. This would give a two terrace result and would still retain the present riffles, pools and gravels in the Guadalupe Creek until the mitigation planting and stream are viable for steelhead and salmon. I feel this is the only rational approach as there is so little room on the the northwest bank for planting and it will be an age before it can give any real SRA relief, if ever. 17-3

Midway, in Reach 2 at the Camden bridge I would advise this same design of a mitigation bypass channel at a slightly higher elevation and with the appropriate meander that naturally would result in a braided channel. This braided channel did exist where the percolation ponds were placed in the old gravel pits, if I'm not mistaken, and so would naturally reestablish themselves if given sufficient room for meander. The trees just below the Camden Bridge are essential to retain for shade and habitat and any disturbance should be avoided or else double indemnity with SRA mitigation measures! 17-4

It is very regrettable that I was not informed of the field trip timing as I am not comfortable that this project is not going to do more damage than good for this remnant salmon run. The double terracing and bypass stream is the only method that appears to offer a trace of viable habitat for these fish in the future, but you must retain at least a shred of what is viable now. 17-5

Sincerely,

Libby Lucas

Libby Lucas
174 Yerba Santa Avenue
Los Altos, CA 94022
650 948-3552

P.S. ALTERNATIVE 4 has modified excavated terrace and bypass meander for linear mitigation planting... retains riffles, runs, pools and existing canopy and maximizes SRA! Page 1

ALTERNATIVE 4

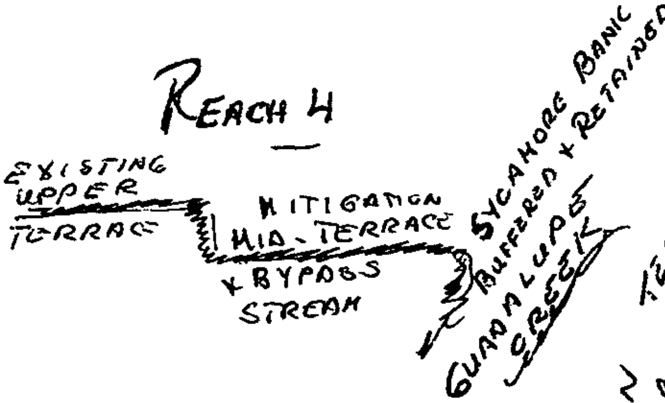
GUADALUPE CREEK

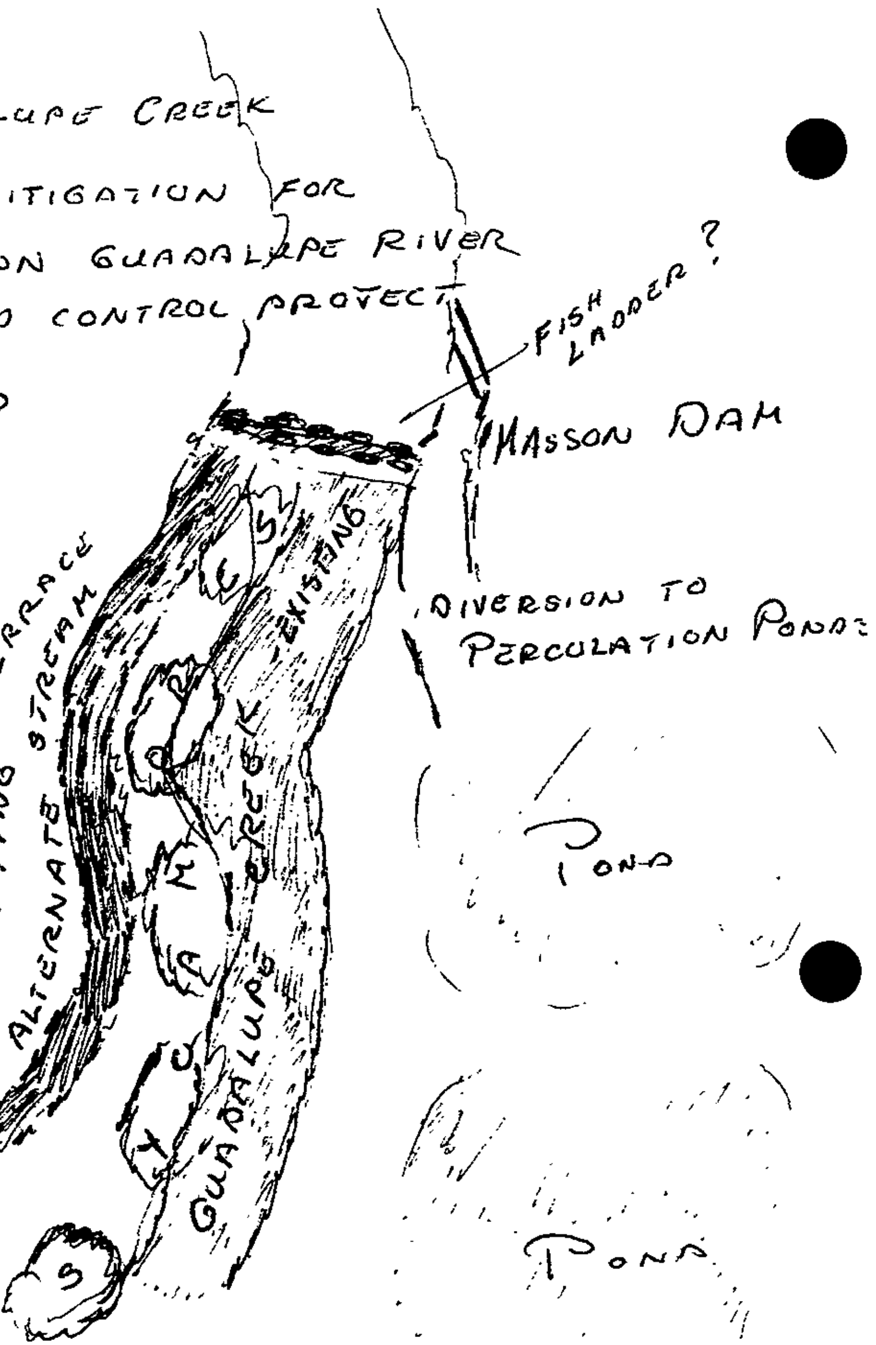
SRA MITIGATION FOR

DOWNTOWN GUADALUPE RIVER

FLOOD CONTROL PROJECT

REACH 4


EXISTING UPPER TERRACE
MITIGATION MID-TERRACE + BYPASS STREAM
SYCAMORE BANK BUFFERED + RETAINED
GUADALUPE CREEK

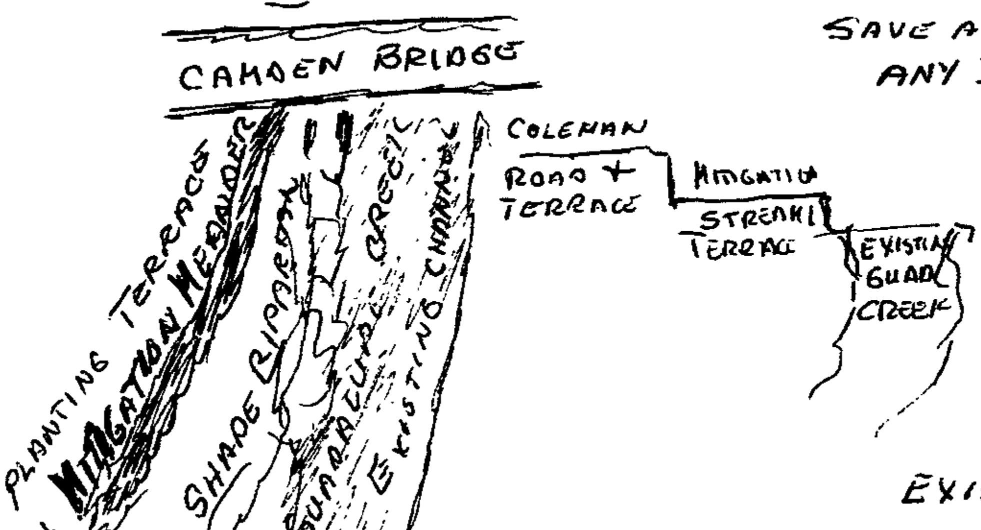


RETAIN GUAD. CREEK FLOWS FOR FISHERY

UPPER GUADALUPE CREEK MEANDER NEEDS GOOD GEOMORPHOLOGY REVIEW
- WHY IS CREEK CUTTING DOWN - BRIDGES NOT WELL DESIGNED - IE
- CAMDEN CONSTRICTS

REACH 2

SAVE ALL SYCAMORES --- ANY ISLANDS CREATED BY MEANDER WITH HISTORIC CREEK PROVIDE SRA REFUGIA


CAMDEN BRIDGE
PLANTING TERRACE & MITIGATION MEANDER
SHADE RIPARIAN
GUADALUPE CREEK EXISTING CHANNEL
COLEMAN ROAD + TERRACE
MITIGATION STREAM TERRACE
EXISTING GUAD CREEK

RETAIN ALL EXISTING TREES FOR SRA AND CANOPY FOR EXISTING GUADALUPE CREEK

MODIFIED TERRACE EXCAVATION AND FOR SHADE FOR ALTERNATE MITIGATION CHANNEL & PLANTINGS

D.2.34 Responses to Comments from Libby Lucas, 174 Yerba Santa Avenue, Los Altos, CA 94022 (January 22, 2001)

D.2.34.1 Response to Comment 17-1

As described in EIR/EIS Section 2.3.1.2, the project has been designed to minimize impacts on existing water management operations and does not include alteration of existing water management practices in the project area. Significant modifications to the existing Los Capitancillos Percolation Pond system have never been proposed as part of the Guadalupe Creek Restoration Project.

Please see Master Response 3 for discussion of public access and recreation on the project site.

D.2.34.2 Response to Comment 17-2

As described in EIR/EIS Section 2.3.1.2, the project has been designed to minimize impacts on existing resources. The majority of the existing riparian vegetation in the project area will remain unaffected by the project. EIR/EIS Table 2-2 shows impacts on existing vegetation (including Phase 1 plantings) expected to result from implementation of the proposed project. This table also shows the associated mitigation requirements and the net planting area. Impacts on existing vegetation will be mitigated onsite.

D.2.34.3 Response to Comment 17-3

As stated in EIR/EIS Section 2.4.1.4, the proposed project will entail only minimal modifications to the existing channel planform in Reach 4 between Masson Dam and Percolation Pond 1. In this reach, a high floodplain terrace similar to that recommended by the commentor will be excavated on the southern bank of the creek, along the Los Capitancillos Project site. In addition, the existing levy maintenance road will be narrowed to create additional planting area on the north bank. Downstream of Percolation Pond 1, the existing channel will be shifted to the north to follow its historical alignment.

As described in EIR/EIS Section 2.3.1.2, the project has been designed to minimize impacts on existing resources. The proposed project will maintain most of the existing instream habitat in Reach 4. Areas for which channel realignment is proposed consist predominantly of highly modified runs, which offer limited habitat value.

D.2.34.4 Response to Comment 17-4

We believe the commentor is referring to the Meridian Avenue bridge; the Camden Avenue bridge is outside of the project area. The proposed project will maintain the existing channel planform in Reach 2, downstream of the Meridian Avenue bridge. A high floodplain terrace will be excavated on the City of San Jose parcel on the south bank in order to provide additional planting area while maintaining flood conveyance capacity. The existing stand of willows (*Salix* sp.) downstream of the bridge will not be affected by the proposed project.

D.2.34.5 Response to Comment 17-5

Comment noted. Please refer to responses to Comments 17-2, 17-3, and 17-4.

D.2.35 Comment from Crystal Fritz, Pioneer High School (December 19, 2000 Public Hearing)

Please see *18-1* in the transcript of public hearing comments that begins on page D-22.

D.2.36 Response to Comment from Crystal Fritz, Pioneer High School (December 19, 2000 Public Hearing)

D.2.36.1 Response to Comment 18-1

During construction, students will not be able to carry out monitoring activities in the project area because the project reaches of Guadalupe Creek will be dewatered to accommodate construction activities. In addition, construction activities will pose a potential safety hazard to students and faculty members. However, the District will work with Pioneer High School to identify alternative sites that can be utilized during project construction for environmental education activities.

After project construction has been completed, the District will work with Pioneer High School to identify suitable monitoring locations within the project area that will provide environmental education opportunities while ensuring participant safety and protection of the mitigation plantings.

D.2.37 Comments from Bruce H. Wolfe, Watershed Management Division, California Regional Water Quality Control Board, Oakland (January 16, 2001)

California Regional Water Quality Control Board
San Francisco Bay Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov
1515 Clay Street, Suite 1400, Oakland, California 94612
Phone (510) 622-2300 • FAX (510) 622-2460

Gray Davis
Governor

January 16, 2001
File No. 2188.05 (RKM)

Mr. Al Gurevich
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Dear Mr. Gurevich:

Subject: Comments on the draft EIR/EIS for the Guadalupe Creek Restoration Project

Staff of the Regional Board have reviewed the subject document and have the comments below. In general, the draft EIR/EIS thoroughly describes an outstanding and innovative project to restore riparian vegetation and anadromous fish habitat along 1.7 miles of Guadalupe Creek. The document also describes potential adverse environmental impacts and the means to avoid these potential impacts through careful project planning and implementation. There are a number of areas where clarification is needed to produce a final EIR/EIS:

MITIGATION

1. The document includes assertions that the Restoration Project, based on its area and linear extent, provides appropriate waterbody functions to exceed the mitigation needs of the Downtown Project, but this should be quantified. The final EIR/EIS should include a table clarifying the impacts of the Downtown Project, the appropriate mitigation for these impacts, and the degree to which the Restoration Project meets or exceeds those mitigation needs. This should include a discussion of the inputs and modeling assumptions of the HEP model that calculated the needed mitigation. 19-1
2. The document asserts that mitigation is not required for temporary impacts to 0.94 acres of riverine wetlands and 0.6 acres of non-wetland stream channel. This is incorrect. Both permanent and temporal impacts require mitigation. The final EIR/EIS should show how all impacts to these waterbodies will be appropriately mitigated by the Restoration Project. 19-2

MONITORING

3. It is not clear that the monitoring described in the document will adequately verify Restoration Project success. It is our understanding that some elements of the monitoring plan for the Downtown Project apply to the Restoration Project. The final EIR/EIS should contain a complete description of proposed monitoring, including identification of sampling stations and clarification of sampling methodology. Board staff will be providing additional comments on the Downtown Project's monitoring plan in that project's draft Waste Discharge Requirements. 19-3

TEMPERATURE AND FISH PASSAGE CONDITIONS

4. It is not clear from the EIR/EIS whether full benefits of the channel modifications and revegetation will occur without additional flow releases to the project reaches. It appears that the Project will provide insufficient water depth for anadromous fish passage for the vast majority of the October through April period and may result in insufficient temperature reductions for suitable fish rearing habitat. The final EIR/EIS should address issue. 19-4
5. The final EIR/EIS should include a graph showing the days on which fish passage will be possible through the project reaches. It is unclear whether the periods of non-passage extend for a few days or for a few weeks. 19-5
6. The final EIR/EIS should include a temperature versus time graph that shows for various points in the project reaches how temperature currently varies seasonally and is expected to vary over the first five years after project construction. Clarify how this pattern will change up until full maturity of the riparian canopy and what impacts this may cause. 19-6
7. The final EIR/EIS should also clarify what impact increasing flows to the levels needed for optimal fish passage would have on this temperature pattern. 19-7
8. The EIR/EIS states that sufficient depths to allow fish passage occur only 25% of the days between October and April under current conditions. The document also states that flows of 5-7 cfs are needed to achieve the needed depths. The final EIR/EIS should indicate what flow releases at Masson Dam are needed to consistently achieve 5-7 cfs in Reach 1. The document should also indicate the flow rates at Masson Dam necessary to increase fish passage rates to both 50% and 75% of the days during the October-April period. 19-8

GROUNDWATER ACCESSIBILITY

9. It appears that success of vegetative planting is dependent upon groundwater being accessible to the root structure of the plantings. Additional clarification is needed in the final EIR/EIS to indicate whether groundwater depth is appropriate and whether roots will be able to penetrate the soil column. 19-9
10. The final document should include a table of piezometer data from this past summer and graphs showing seasonal variation of groundwater elevation. 19-10
11. The final document should include a table showing the depth to groundwater requirements of the plantings planned for the Project. 19-11
12. It appears that improper soil conditioning could result in project failure. Provide additional clarification as to how soil borings or soil excavation in planting areas will be used to assure sufficient fine-grained material for plant viability or to eliminate impervious soil layers. 19-12

VEGETATION

13. The typical cross-sections are misleading in that they visually infer that full-grown trees are being planted. The final EIR/EIS should show the typical vegetative cross-sections at 2, 5, and 10 years after project construction, similar to those included in the project reports for the Upper Guadalupe Project. 19-13

MERCURY

14. SCVWD has done a commendable job in its preliminary assessment of the concentrations, form, and biological availability of mercury in soils, sediments, water, and pore water in the proposed project reach. Based on the results of assessment, and the proposed soil management plan, the Project should have a net improvement on water quality with regard to mercury. This is because: 19-14

1) The Project proposes to remove substantial amounts of mercury polluted soils and sediments from the aquatic ecosystem;
2) The Project proposes to prevent substantial amounts of mercury from being transported downstream through its erosion control and revegetation measures; and,
3) The Project's proposed design will minimize conditions that are favorable to methylation, such as stagnant pools and anoxic conditions.

Our only additional comment on the soil management plan is that SCVWD should retain some flexibility on the extent of excavation in the active channel. The overall goal is to minimize downstream transport of mercury. If the active channel has soils above 1 ppm mercury, but those soils are hard-packed, competent soils, it may cause more harm than good to overexcavate them. We suggest modifying your SMP for overexcavation as you have proposed in attached Figure 2 decision tree to include a decision point evaluating the mobility of soils in the active channel. Our proposed modification to the SMP is shown in the attached Figure 3 decision tree. The State Water Code focuses on the goal of protecting and restoring the beneficial uses of waterbodies but does not allow the Regional Board to specify precisely how to achieve that goal. In that context, here we are saying "minimize downstream transport of mercury polluted sediments," and allowing the project manager to decide on the best way to comply with this requirement. 19-15

In the first hearing of the EIR before the SCVWD Board of Directors, Board members and interested parties questioned the environmental benefit of attracting anadromous fish into a region impacted by mercury mining waste. Having established that the project will bring less mercury to fish downstream, the public is asking whether it is a good idea to bring fish upstream to the mercury.

It is important to recognize that the Project, when implemented, should improve mercury pollution in a small section of a highly impacted watershed. The main source of this mercury is upstream of the project reach, in the lands of the former New Almaden mining district. The SCVWD has taken a leadership role in developing a Total Maximum Daily Load (TMDL) for mercury in the Guadalupe River watershed; that TMDL is ultimately directed at restoring beneficial uses by reducing mercury concentrations in fish caught in the Guadalupe River, its tributaries, and its reservoirs. 19-16

To protect and restore the beneficial use of fishing in the Guadalupe River Watershed, we need both the habitat restoration provided by this project and the pollution cleanup proposed by the Guadalupe River TMDL. The Regional Board staff perspective is that the presence of mercury in the watershed should not be a barrier to habitat restoration. Rather, the habitat restoration elevates a mandate to clean up pollution, a mandate that already exists under the federal Clean Water Act and the State Water Code. 19-16 cont'd

In terms of public health risk, we must accept the need to continue educating the public through fishing advisories, fish consumption warnings, and other forms of effective outreach. This need was present before the Project was proposed, and will continue to exist regardless of whether or not the Project is implemented. As watershed stewards, the SCVWD and Board staff have a responsibility to help the public understand how the legacy of the California Gold Rush and subsequent development in the watershed affects their enjoyment of the waters of the State. 19-17

15. The Project's benefits could be reduced by deposition of mercury-laden sediments from stream reaches upstream of the Project. What interim control measures could be implemented to reduce this potential? 19-18
16. Between 1964 and 1987, sediments behind Masson Dam were collected and removed in annual maintenance procedures. What was the volume of material removed annually? 19-19
17. Could the operation of Masson Dam be modified either alone or in conjunction with Perc Pond # 1 to reduce sediment discharge to the Project area? 19-20
18. What was the volume of material removed from Perc Pond # 1 when Guadalupe Creek was the source of the inflow to the pond? 19

Thank you for the opportunity to comment on the draft EIR/EIS. Please contact Richard McMurtry of my staff at (408) 277-1316 if you have any questions concerning these comments.

Sincerely,

Bruce H. Wolfe

Bruce H. Wolfe, Chief
Watershed Management Division

Attachment – Decision Tree Figures

Cc: Oscar Balaguer, Division of Water Quality, State Board
Kevin MacKay, Jones & Stokes, 2841 Junction Ave, Suite 114, San Jose, CA 95134

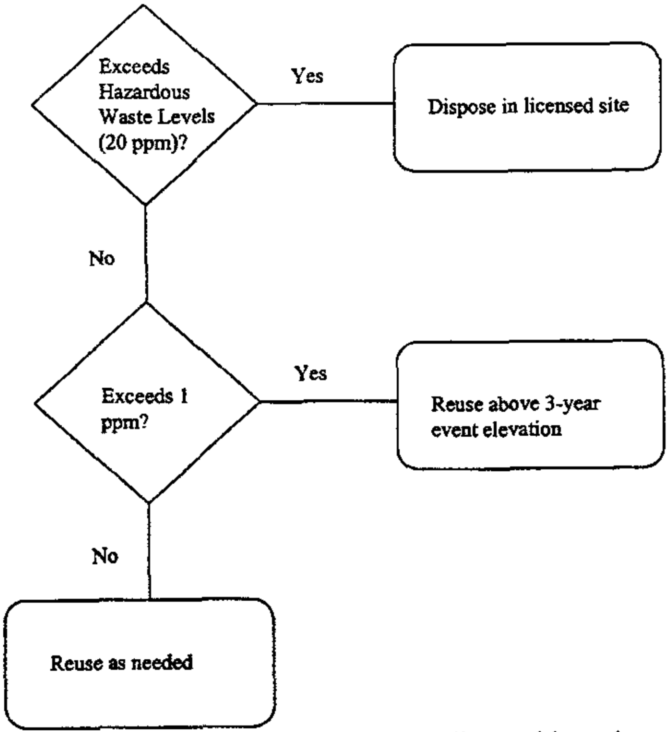

Exceeds Hazardous Waste Levels (20 ppm)?
Yes
Dispose in licensed site
No
Exceeds 1 ppm?
Yes
Reuse above 3-year event elevation
No
Reuse as needed

Figure 1: Decision tree for onsite soil reuse and disposal based on soil mercury concentrations.

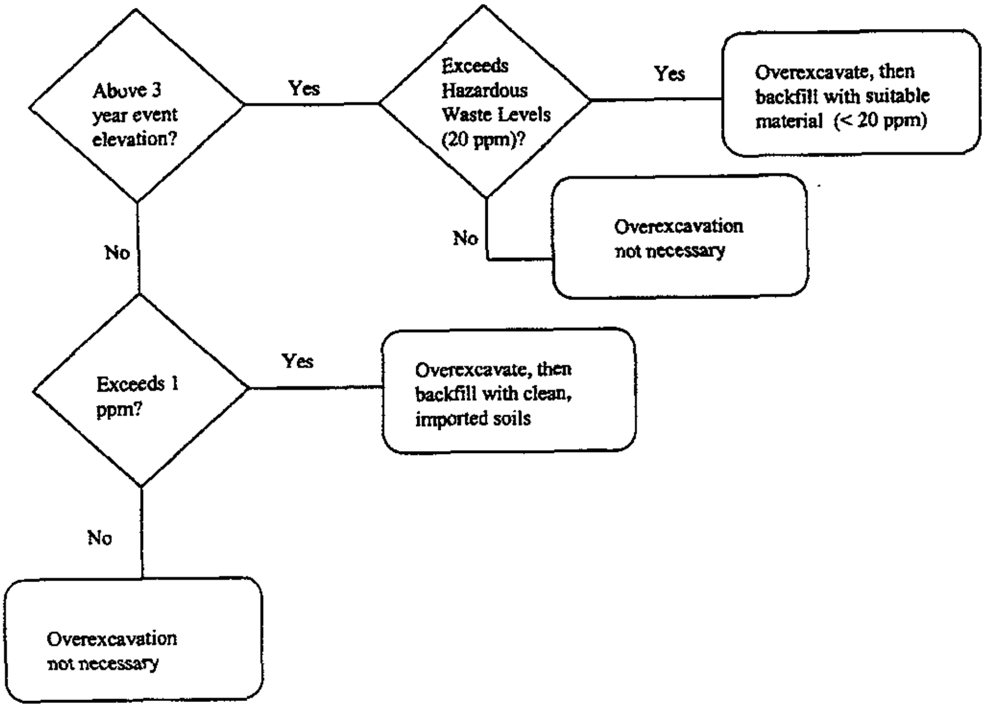

Above 3 year event elevation?
Yes
Exceeds Hazardous Waste Levels (20 ppm)?
Yes
Overexcavate, then backfill with suitable material (< 20 ppm)
No
Overexcavation not necessary
No
Exceeds 1 ppm?
Yes
Overexcavate, then backfill with clean, imported soils
No
Overexcavation not necessary

Figure 2 : Decision tree for overexcavation and backfilling based on soil mercury concentrations, as proposed by SCVWD.

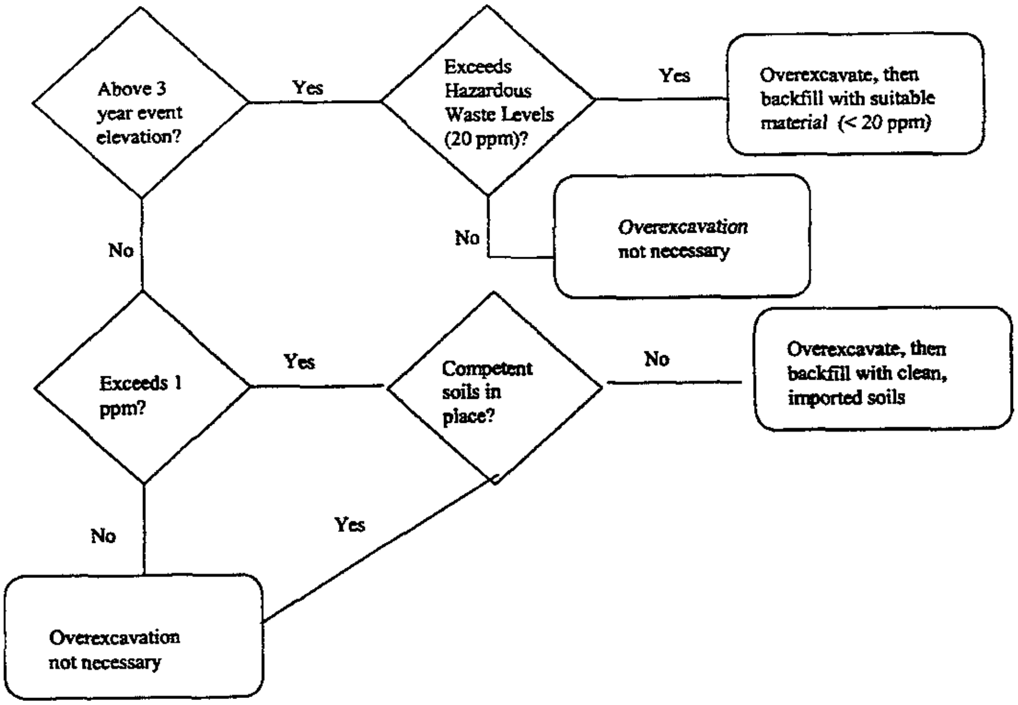

Above 3 year event elevation?
Yes
Exceeds Hazardous Waste Levels (20 ppm)?
Yes
Overexcavate, then backfill with suitable material (< 20 ppm)
No
Overexcavation not necessary
No
Exceeds 1 ppm?
Yes
Competent soils in place?
No
Overexcavate, then backfill with clean, imported soils
No
Yes
Overexcavation not necessary

Figure 3: Decision tree for overexcavation and backfilling based on soil mercury concentrations, as proposed by SCVWD, with recommended changes by SFRWQCB staff comments.

D.2.38 Responses to Comments from Bruce H. Wolfe, Watershed Management Division, California Regional Water Quality Control Board, Oakland, CA (January 16, 2001)

D.2.38.1 Response to Comment 19-1

Water temperature goals for the Guadalupe Creek Restoration Project were based on the results of HEP analysis conducted for the Guadalupe River Flood Protection Project in downtown San Jose; the analysis is discussed in detail in the Downtown Project HEP analysis report (U.S. Army Corps of Engineers 2000b). Further modeling carried out for the proposed project showed that in order to provide sufficient stream shading to meet these temperature goals approximately 12,000 linear feet of SRA cover vegetation would need to be planted between Almaden Expressway and Masson Dam (equivalent to filling all available planting space in a 15 foot-wide corridor along each bank of Guadalupe Creek between Almaden Expressway and Masson Dam). This planting goal is reflected in the project description in Chapter 2 of the EIR/EIS and in EIR/EIS Table 2-2.

Implementation of the Downtown Project is expected to result in the loss of 8,387 linear feet of SRA cover vegetation (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). This loss will be partially mitigated onsite in the Downtown Project area and offsite in the Reach A area. The Downtown Project's remaining SRA cover mitigation "need" of 5,971 linear feet will be amply met by the approximately 13,000 linear feet of SRA cover plantings proposed for the Guadalupe Creek Restoration Project. SRA cover plantings in excess of 5,971 linear feet will be used as onsite mitigation for impacts of the Guadalupe Creek Restoration Project and as mitigation for future District projects. Tables S.6-1–S.6-3 in the Downtown Project environmental document (U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000) summarize the impacts and proposed mitigation measures associated with implementation of the Downtown Project.

D.2.38.2 Response to Comment 19-2

Under existing conditions, habitat on the project site includes a higher percentage of riverine wetland vegetation than a less disturbed riparian community would be expected to support (see EIR/EIS Section 4.2.2.6). Implementation of the proposed project will result in the temporary loss of as much as 0.94 acre of jurisdictional riverine wetland that is scattered in small patches along the edge of the low-flow channel, on benches, and on the edges of gravel bars. In the short term, this habitat is expected to reestablish itself because riverine wetland species are adapted to the dynamic conditions of the stream environment. Recolonization of the project site by riverine wetland species will be facilitated by substrate improvement and channel modifications included in the proposed project; populations of the same species within and upstream of the project area will likely be able to supply propagules. Over the long term, patches of riverine wetland vegetation are expected to persist in gaps in the riparian canopy, but increased riparian cover and stream shading will shift the habitat balance on the project site toward a more natural species composition than the project area presently supports (i.e., less area of riverine wetland vegetation and more of riparian scrub vegetation).

The project will create approximately 6.4 acres of high-quality riparian habitat, a less common and more biologically diverse natural community than riverine wetlands. The proximity of the newly established riparian vegetation to riverine wetlands will increase overall habitat quality and functionality in the project area, enhancing wildlife foraging and cover habitat, reducing erosion and water turbidity, and increasing pollutant filtering. Furthermore, the establishment of riparian vegetation, along with channel modification and creation of aquatic habitat features, will improve instream fish habitat. Thus, although some loss of riverine wetlands will occur, implementation of the proposed project will result in a substantial net increase in habitat values in the project area. The loss of riverine wetland habitat as a result of project implementation is therefore considered a less-than-significant impact, and no mitigation is required.

Moreover, the temporary removal of riverine wetland vegetation and the long-term decrease in the area of riverine wetland vegetation expected to result from increased riparian canopy and stream shading will likely reduce mercury methylation in the project reaches.

The project will temporarily affect as much as 0.6 acre of waters of the United States, not including wetlands, as a result of project modifications to the stream channel. These modifications will lengthen the channel, increase instream cover and channel complexity, and substantially improve aquatic habitat for anadromous fish. Because existing instream aquatic habitat for anadromous fish in Guadalupe Creek is marginal at best, and because implementation of the proposed project will result in a substantial net improvement in instream aquatic habitat within the project area, the loss of other waters of the United States is considered a less-than-significant impact. Therefore, no mitigation is required.

D.2.38.3 Response to Comment 19-3

EIR/EIS Section 2.4.1.5.12 outlines the maintenance and monitoring plan for the proposed project. More detailed information is provided in Chapter 6 (*Maintenance Program*) of the Engineer's Report. In addition, the proposed project will adhere to the detailed Guadalupe Creek monitoring parameters established in the Mitigation and Monitoring Plan for the Guadalupe River Flood Protection Project in downtown San Jose (Volume 2, Appendix 3 in U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). The parameters to be monitored include: planting survival rates; health and vigor of planted vegetation; natural recruitment of native species; vegetative cover (including non-native species); water temperature; and anadromous fish passage and habitat quality.

D.2.38.4 Response to Comment 19-4

As described in Engineer's Report Section 3.4.2.6 (*Water Temperature*), critical limiting water temperature for juvenile steelhead occurs during summer rearing. Data collected in 1996–1997 by the District indicate that summer water temperatures in the project area range from 56° F to 87° F at Almaden Expressway and 55° F to 71° F at Masson Dam. Based on the Biological Data Report on steelhead and chinook prepared for the Guadalupe River Project in downtown San

Jose (U.S. Army Corps of Engineers 2000a), postmitigation average maximum temperatures in lower Guadalupe Creek are expected to drop below the lethal threshold for chinook salmon during the critical summer months. Postmitigation average maximum monthly temperatures for all of the project reaches of Guadalupe Creek reach are expected to be 5.5° F lower than preproject temperatures during August of the dry/median year. In isolated areas within the project reaches, average maximum April temperatures are expected to show a postproject decrease of as much as 7.6° F, and average April temperatures are expected to decrease by as much as 3.9° F.

As described in EIR/EIS Section 2.3.1.2 (*Secondary Objectives*), the proposed project has been designed to minimize impacts on existing water management operations and does not include alteration of existing water management practices in the project area. Streamflow augmentation is not incorporated in the proposed project or in any of the project alternatives. However, the proposed project does provide for narrowing the active low-flow channel, which will deepen the water column at all flows and may reduce water temperatures.

In addition, the District is a participant in the FAHCE program, which was initiated by the District and DFG to address concerns regarding the District's incremental contribution to cumulative impacts on chinook salmon and steelhead in Santa Clara County's rivers and creeks. Primary goals of the FAHCE program include the establishment of appropriate flow targets and design of flow and non-flow water management strategies to maintain steelhead and chinook salmon populations in the County's natural waterways. Please see Section 5.1.2.5 of the EIR/EIS for a more complete discussion of the FAHCE program.

Instream features that will be installed as a result of the proposed project have been designed to accommodate possible increases in summer base flow under the FAHCE program.

In addition, as described in the response to Comment 19-3, the proposed project will adhere to the detailed monitoring parameters for Guadalupe Creek water temperature established in the Mitigation and Monitoring Plan for the Guadalupe River Flood Protection Project in downtown San Jose (Volume 2, Appendix 3 in U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). If the results of this monitoring program indicate that the project does not meet the measurable objective for water temperature, adaptive management measures will be developed and implemented by an Adaptive Management Team including representatives with appropriate expertise from the District, the Corps, and other resource and regulatory agency staff.

D.2.38.5 Response to Comment 19-5

Please see the response to Comment 19-8.

D.2.38.6 Response to Comment 19-6

A graph showing preproject, postproject (year 0), and postmitigation (year 10 and year 40) simulated water temperatures for the project area has been included in Appendix E of the project Engineer's Report.

D.2.38.7 Response to Comment 19-7

The changes in water temperature that result from using supplemental water to increase flow levels can vary widely, depending on a number of factors. Relevant factors include the volume and temperature of existing instream flow, the temperature of the supplemental water, the width and depth of the channel, and the percentage of shaded stream surface. A graph showing simulated changes in water temperature based on three flow-volume scenarios for preproject conditions (1, 5, and 9 cfs) has been included in Appendix E of the Engineer's Report.

Please see the response to Comment 19-8 for additional discussion of flow levels and fish passage.

D.2.38.8 Response to Comment 19-8

This comment refers to an assessment of fish passage under existing conditions that was conducted for Guadalupe Creek by the U.S. Army Corps of Engineers in 1998. Using width, depth, and length criteria to evaluate passage in critical stream reaches that included shallow segments, this assessment identified a number of shallow riffles (maximum depth <0.5 feet, length of traverse >50 feet in 50% of the cases) that would impede fish passage under existing low-flow conditions (2.7 cfs at Masson Dam as estimated at Gage 43). Based on this assessment, the Corps estimated that under existing conditions a minimum flow of 5–7 cfs at Masson Dam would be required to achieve the needed depths in these critical stream reaches.

Under existing conditions passage in Guadalupe Creek is often extremely poor in fall and early winter (September–December) because of low streamflow. However, passage conditions tend to improve in late winter and spring (January or February–April) and are often better than those in the Guadalupe River during the same time frame.

As described in EIR/EIS Section 2.3.1.2 (*Secondary Objectives*), the project has been designed to minimize impacts on existing water management operations and does not include alteration of existing water management practices in the project area. Streamflow augmentation is not incorporated in the proposed project or in any of the project alternatives. However, the proposed project does provide for narrowing the active low-flow channel, which will deepen the water column at all flows. In addition, the proposed project includes instream features (e.g., cross weirs, V-weirs) that will create shallow step pools. These instream modifications will increase depth in the low-flow channel, create resting pools for migrating fish, and decrease the length of existing riffles and runs in the critical stream reaches mentioned above.

In addition, the District is a participant in the FAHCE program, which was initiated by the District and DFG to address concerns regarding the District's incremental contribution to cumulative impacts on chinook salmon and steelhead in Santa Clara County's rivers and creeks. Primary goals of the FAHCE program include the establishment of appropriate flow targets and design of flow and non-flow water management strategies to maintain steelhead and chinook salmon populations in the County's natural waterways. Please see Section 5.1.2.5 of the EIR/EIS for a more complete discussion of the FAHCE program.

Instream features that will be installed as a result of the proposed project have been designed to accommodate possible increases in summer base flow under the FAHCE program.

Finally, as described in the response to Comment 19-3, the proposed project will adhere to the detailed monitoring parameters for Guadalupe Creek water temperature established in the Mitigation and Monitoring Plan for the Guadalupe River Flood Protection Project in downtown San Jose (Volume 2, Appendix 3 in U.S. Army Corps of Engineers and Santa Clara Valley Water District 2000). If the results of this monitoring program indicate that the project does not meet the measurable objective for water temperature, adaptive management measures will be developed and implemented by an Adaptive Management Team including representatives with appropriate expertise from the District, the Corps, and other resource and regulatory agency staff.

D.2.38.9 Response to Comment 19-9

Based on water-level measurements taken in soil test pits in the project area and on subsequent piezometer readings, depth to groundwater varies throughout the project area. In general, groundwater elevations decrease significantly relative to surface-water elevations with increased distance from the main channel. This gradient is especially steep in Reaches 1 and 2, which are bordered by the lower ponds of the percolation pond system. A table and graphs showing groundwater data based on piezometer readings is provided in Appendix E of the project Engineer's Report.

Development of the planting program for the project reaches of Guadalupe Creek was guided by a number of site-specific factors, including flood return frequency, geomorphology, and depth to groundwater. Based on these factors, five planting zones were identified: (A) water's edge, (B) lower slope, (C) upper slope and lower bench, (D) upper bench and bench slope, and (E) bar surface. Species were assigned to one or more planting zones based on species-specific requirements. A full description of the planting zones, including the rationale for inclusion of plant species, is provided in Appendix E of the Engineer's Report.

In general, the proposed project will lower existing surfaces by 2–3 feet to create surfaces that are more frequently inundated by surface flow and are closer to groundwater levels. As described above, groundwater data from the project area show that depth to groundwater generally increases away from the main channel. In planting zones closer to the main channel (Zones A and B) groundwater will be less than 3 feet below the newly created floodplain surface. In Zones C and D, groundwater will be 3–8 feet below the newly created surfaces. Species selected for planting in

Zone D include shrubs and trees that are tolerant of more xeric conditions and/or are able to develop a deep root system, such as oaks (*Quercus* spp.).

D.2.38.10 Response to Comment 19-10

The project Engineer's Report will be modified to include a table and graphs showing groundwater data based on piezometer readings to date (see Appendix E).

D.2.38.11 Response to Comment 19-11

Please see response to Comment 19-9.

D.2.38.12 Response to Comment 19-12

Where soils are inadequate or compacted, have limited ability to hold water, or have other characteristics that would limit the success of plantings, soils will be treated before plantings are installed. In selected areas, after any necessary excavation has occurred, soils will be loosened to a depth of 30 inches to aid root penetration and allow plants to reach groundwater. After existing soils have been loosened, a layer of topsoil 6–8 inches thick will be applied and mixed to provide a more hospitable growing environment. Topsoil will be salvaged from the project site. In addition, a 36-inch-deep hole will be augered at each planting site to break up impervious soil layers and facilitate root penetration.

D.2.38.13 Response to Comment 19-13

The project Engineer's Report will be modified to include typical cross sections depicting postproject conditions at 2, 5, and 10 years (see Appendix E).

D.2.38.14 Response to Comment 19-14

Comment noted.

D.2.38.15 Response to Comment 19-15

Comment noted. The Soil Management Plan has been modified as follows.

> "Excavated surfaces above the elevation of the 3-year recurrence interval that contain mercury concentrations exceeding hazardous waste levels will be overexcavated and replaced with soils meeting the above criteria for onsite reuse. Excavated surfaces

below the elevation of the 3-year recurrence interval that contain unconsolidated soils will be overexcavated and replaced with clean imported soil."

D.2.38.16 Response to Comment 19-16

Comment noted.

D.2.38.17 Response to Comment 19-17

Comment noted. Please see response to Comment 3-3.

D.2.38.18 Response to Comment 19-18

As described in Section 2.3.1.1 of the EIR/EIS, the primary objective of the proposed project is to restore SRA cover vegetation and improve anadromous fish habitat in portions of lower Guadalupe Creek; as proposed, the project focuses specifically on the reaches between Almaden Expressway and Masson Dam. Thus, the implementation of upstream erosion and sediment control measures is outside the scope of the proposed project as described and analyzed in this EIR/EIS.

The implementation of upstream sediment control measures would be most effective in the context of a watershed-level effort. The integrative regional perspective offered by existing cooperative efforts-including the WMI and the RWQCB's TMDL program for mercury-provide an appropriate context for the development and implementation of upstream sediment control measures. For additional information on cooperative regional efforts to address the issue of mercury contamination in the Guadalupe River watershed, please see Master Response 1.

D.2.38.19 Response to Comment 19-19

Historically, sediment accumulated behind Masson Dam when the flashboards were in place (during the winter months). Accumulated sediment was removed only from the concrete foundation and typically amounted to an estimated 2–7.5 cubic yards.

During the period to which this comment refers, the District did not keep records of the disposal of sediments removed during routine maintenance operations. Sediments removed during maintenance of Masson Dam (and other District facilities) were disposed of in landfills or were reused as fill in District projects.

The District now records the disposal of all sediments removed during maintenance of District facilities. In addition, in order to determine appropriate procedures for handling and disposal, sediments and other spoils are tested for hazardous and toxic materials content in accordance with all applicable regulations.

D.2.38.20 Response to Comment 19-20

Masson Dam is a flashboard weir structure that is used to divert water from Guadalupe Creek into the Los Capitancillos percolation pond system. As such, it was not designed to trap sediment and has very limited storage capacity. At present, water from Masson Dam is diverted into Percolation Pond 1, which serves as a sediment detention base for the percolation pond system, but has only a limited sediment retention capability. The modification of these structures to control sediment from upstream sources is outside the scope of the proposed project as described and analyzed in this EIR/EIS.

The implementation of upstream sediment control measures would be most effective in the context of a watershed-level effort. The integrative regional perspective offered by existing cooperative efforts—including the WMI and the RWQCB's TMDL program for mercury—provide an appropriate context for the development and implementation of upstream sediment control measures. For additional information on cooperative regional efforts to address the issue of mercury contamination in the Guadalupe River watershed, please see Master Response 1.

D.2.38.21 Response to Comment 19-21

According to District records, the last time sediment was removed from the Los Capitancillos percolation ponds was in 1988. Material cleaned from the recharge ponds was stored onsite and material cleaned from the desilting basin (Percolation Pond 1) was disposed of offsite. Approximately 1,058 cubic yards of material was disposed of offsite.

D.2.39 Comments from David Farrel, Federal Activities Office, U.S. Environmental Protection Agency, San Francisco (January 25, 2001)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

January 22, 2001

Brad Hubbard
Sacramento District
U.S. Army Corps of Engineers
1325 "J" Street
Sacramento, CA 95814

Dear Mr. Hubbard:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement/Report (DEIS/R) and associated Engineer's Report for the ***GUADALUPE CREEK RESTORATION PROJECT, Almaden Expressway to Masson Dam, San Jose, Santa Clara County, California*** (EIS #000421). Our comments are provided under the National Environmental Policy Act (NEPA), Section 309 of the Clean Air Act, and the Council on Environmental Quality's (CEQ) NEPA Implementing Regulations (40 CFR 1500-1508). The Corps of Engineers is the Federal agency responsible for ensuring compliance with the NEPA while the Santa Clara Valley Water District (SCVWD) is the local agency responsible for ensuring consistency with the California Environmental Quality Act (CEQA).

The purpose of the proposed project is to restore native coldwater fish habitat that has been lost or degraded due to urbanization and prior stream modifications. The *primary* objective of this restoration project is to restore SRA cover vegetation and improve aquatic habitat for anadromous fish (steelhead and chinook salmon) in lower Guadalupe Creek between Almaden Expressway and Masson Dam. Restoring SRA cover vegetation and improving aquatic habitat will create and maintain suitable water temperatures, increase organic material, and provide habitat to support all life stages of anadromous fish. A dozen "*secondary*" objectives are also identified on page Abs-1 of the DEIS/R (abstract).

The DEIS/R analyzes a range of alternative plans to meet the primary objective and which were further screened based on their expected success in meeting *secondary* project objectives. Alternatives considered include: channel and floodplain modification (the proposed project/preferred alternative); reduced channel and floodplain modification; minimal channel and floodplain modification; and No Action (No-Project Alternative under CEQA).

The proposed project/preferred alternative includes channel relocation, floodplain development, and bank stabilization to enhance instream habitat and support the establishment of SRA vegetation. Implementation of the proposed project/preferred alternative would involve shifting approximately 2,500 linear feet (lf) of existing stream channel, excavating and removing approximately 42,000 cubic yards of material, and importing 13,000 cubic yards material to create planting sites. Under the proposed project/preferred alternative, approximately 725 lf of bank protection features would be installed and approximately six (6) acres of riparian vegetation, and 13,000 lf of SRA cover, would be established.

Based upon our review of the proposed project and the DEIS/R, we assign a rating of LO, Lack of Objections. We support the efforts of the Corps of Engineers and the SCVWD to restore SRA cover vegetation and improve aquatic habitat for anadromous fish in lower Guadalupe Creek. We do, however, have several comments requiring clarification in the Final Environmental Impact Statement (FEIS), as follows. 20-1

Storm Water Permit: Page 1-11 indicates that "NPDES permits are required for projects that disturb more than 5 acres of land." The FEIS should acknowledge the applicability of the Phase II storm water rule which expands the existing NPDES permitting program to address storm water discharges from construction sites between one to five acres. The final rule became effective February 27, 2000. For your reference we attach a copy of an EPA fact sheet regarding the Storm Water Phase II Final Rule. We direct your attention to page 4 of the fact sheet regarding Best Management Practices (BMPs) to control pollutants in storm water discharges from the project's construction site. The Final EIS (FEIS) should address BMPs that could be integrated into the proposed project. 20-2

Secondary Objectives: The DEIS/R (e.g., at p. 2-4) identifies a host of "secondary objectives" for the project. Page 2-4 informs us that the "[e]xpected success in achieving secondary project objectives was used to evaluate potential project alternatives and to identify alternatives for detailed consideration in this document." (And, by implication, to eliminate alternatives from detailed consideration). It is unclear whether these "secondary objectives"are viewed by the Corps as constituting an integral element of the purpose and need for the project under NEPA. It is also not clear whether these secondary objectives may have been used to eliminate otherwise reasonable alternatives during the screening-and-elimination process of various alternatives. This should be clarified in the FEIS. 20-3

Editorial: The DEIS/R (see last paragraph on p. 1-10) states that "Discharges to waters of the United States are further regulated under CWA Section 230." This should be modified to read "Discharges . . . are further regulated under 40 CFR 230," rather than *Section* 230. 20-4

We appreciate the opportunity to comment on the DEIS/R. Please send one copy of the FEIS to me at the letterhead address (code: CMD-2) when it is filed with EPA's Washington, D.C. office. If you have any questions, please call David Tomsovic of my staff at 415-744-1575. 20-5

Sincerely,

David Farrel, Manager
Federal Activities Office

Attachment: 1
(a) EPA fact sheet on storm water phase II final rule

cc: Al Gurevich, Santa Clara Valley Water District
5750 Almaden Expressway, San Jose, CA 95118

United States
Environmental Protection
Agency

Office of Water
(4203)

EPA 833-F-00-013
January 2000
Fact Sheet 3.0

EPA

Storm Water Phase II Final Rule

Small Construction Program Overview

The 1972 amendments to the Federal Water Pollution Control Act, later referred to as the Clean Water Act (CWA), prohibit the discharge of any pollutant to navigable waters of the United States from a point source unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. Efforts to improve water quality under the NPDES program traditionally have focused on reducing pollutants in industrial process wastewater and municipal sewage treatment plant discharges. Over time, it has become evident that more diffuse sources of water pollution, such as storm water runoff from construction sites, are also significant contributors to water quality problems.

Sediment runoff rates from construction sites are typically 10 to 20 times greater than those from agricultural lands, and 1,000 to 2,000 times greater than those of forest lands. During a short period of time, construction activity can contribute more sediment to streams than can be deposited over several decades, causing physical and biological harm to our Nation's waters.

In 1990, EPA promulgated rules establishing Phase I of the NPDES storm water program. Phase I addresses, among other discharges, discharges from large construction activities disturbing 5 acres or more of land. Phase II of the NPDES storm water program covers small construction activities disturbing between 1 and 5 acres. Phase II became final on December 8, 1999 with small construction permit applications due by March 10, 2003 (specific compliance dates will be set by the NPDES permitting authority in each State). This fact sheet outlines the construction activities covered by Phase I and Phase II, including possible waiver options from Phase II coverage, and the Phase II construction program requirements.

Who Is Covered Under the Phase I Rule?

Sites Five Acres and Greater

The Phase I NPDES storm water rule identifies eleven categories of industrial activity in the definition of "storm water discharges associated with industrial activity" that must obtain an NPDES permit. Category (x) of this definition is construction activity, commonly referred to as "large" construction activity. Under category (x), the Phase I rule requires all ***operators*** of construction activity ***disturbing 5 acres or greater of land*** to apply for an NPDES storm water permit. Operators of sites disturbing less than 5 acres are also required to obtain a permit if their activity is part of a "larger common plan of development or sale" with a planned disturbance of 5 acres or greater. "Disturbance" refers to exposed soil resulting from activities such as clearing, grading, and excavating. Construction activities can include road building, construction of residential houses, office buildings, industrial sites, or demolition.

What Is Meant by a "Larger Common Plan of Development or Sale"?

As defined in EPA's NPDES storm water general permit for large construction activity, a "larger common plan of development or sale" means a contiguous area where multiple separate and distinct construction activities are occurring under one plan (e.g., the operator is building on three half-acre lots in a 6-acre development). The "plan" in a common plan of development or sale is broadly defined as any announcement or piece of documentation

Storm Water Phase II Final Rule Fact Sheet Series

Overview

1.0 – Storm Water Phase II Proposed Rule: An Overview

Small MS4 Program

2.0 – Small MS4 Storm Water Program Overview

2.1 – Who's Covered? Designation and Waivers of Regulated Small MS4s

2.2 – Urbanized Areas: Definition and Description

Minimum Control Measures

2.3 – Public Education and Outreach

2.4 – Public Participation/Involvement

2.5 – Illicit Discharge Detection and Elimination

2.6 – Construction Site Runoff Control

2.7 – Post-Construction Runoff Control

2.8 – Pollution Prevention/Good Housekeeping

2.9 – Permitting and Reporting: The Process and Requirements

2.10 – Federal and State-Operated MS4s: Program Implementation

Construction Program

3.0 – Construction Program Overview

3.1 – Construction Rainfall Erosivity Waiver

Industrial "No Exposure"

4.0 – Conditional No Exposure Exclusion for Industrial Activity (including a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that construction activities may occur on a specific plot.

What Is the Definition of an "Operator" of a Construction Site?

As defined in EPA's storm water general permit for large construction activity, an "operator" is the party or parties that has:

- ☐ Operational control of construction project plans and specifications, including the ability to make modifications to those plans and specifications; *or*
- ☐ Day-to-day operational control of those activities that are necessary to ensure compliance with a storm water pollution prevention plan (SWPPP) for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

There may be more than one party at a site performing the tasks related to "operational control" as defined above. Depending on the site and the relationship between the parties (e.g., owner, developer, contractor), there can either be a single party acting as site operator and consequently be responsible for obtaining permit coverage, or there can be two or more operators, all obligated to seek permit coverage. It is important to note that NPDES-authorized States may use a different definition of "operator" than the one above.

How Is the Phase II Construction Rule Related to the Phase I Construction Rule?

In 1992, the Ninth Circuit court remanded for further proceedings portions of EPA's existing Phase I storm water regulation related to the category (x) discharges from large construction activity (NRDC v. EPA, 966 F.2d at 1292). EPA responded to the court's decision by designating under Phase II storm water discharges from construction activity disturbing less than 5 acres as sources that should be regulated to protect water quality. The Phase II Rule designates these sources as "storm water discharges associated with *small construction* activity," rather than as another category under "storm water associated with *industrial* activity."

Who Is Covered Under the Phase II Construction Rule?

Sites Between One and Five Acres

The Storm Water Phase II Rule automatically designates, as small construction activity under the NPDES storm water permitting program, all operators of construction site activities that result in a ***land disturbance of equal to or greater than 1 and less than 5 acres*****.**

Sites Less Than One Acre

Site activities disturbing less than 1 acre are also regulated as small construction activity if they are part of a larger common plan of development or sale with a planned disturbance of equal to or greater than 1 acre and less than 5 acres, or if they are designated by the NPDES permitting authority. The NPDES permitting authority or EPA Region may designate construction activities disturbing less than 1 acre based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to waters of the United States.

Are Waivers Available for Operators of Regulated Construction Activity?

Yes, but only for small, not large, construction activity. Under the Phase II Rule, NPDES permitting authorities have the option of providing a waiver from the requirements to operators of small construction activity who certify to either one of two conditions:

❶ Low predicted rainfall potential (i.e., activity occurs during a negligible rainfall period), where the rainfall erosivity factor ("R" in the Revised Universal Soil Loss Equation [RUSLE]) is less than 5 during the period of construction activity; *or*

❷ A determination that storm water controls are not necessary based on either:

(A) A "total maximum daily load" (TMDL) that address the pollutant(s) of concern for construction activities; **OR**

(B) An equivalent analysis that determines allocations are not needed to protect water quality based on consideration of instream concentrations, expected growth in pollutant concentrations from all sources, and a margin of safety.

Pollutants of concern include sediment or a parameter that addresses sediment (such as total suspended solids, turbidity, or siltation) and any other pollutant that has been identified as a cause of

The intent of the waiver provision is to waive only those sites that are highly unlikely to have a negative effect on water quality. Therefore, before applying for a waiver, operators of small construction activity are encouraged to consider the potential water quality impacts that may result from their project and to carefully examine such factors as proximity to water resources and sensitivity of receiving waters.

a. *What is the Rainfall Erosivity Factor in Waiver ❶?*

Waiver ❶ uses the Rainfall Erosivity Factor to determine whether the potential for polluted discharge is low enough to justify a waiver from the requirements. It is one of six variables used by the Revised Universal Soil Loss Equation (RUSLE)—*a predictive tool originally used to* measure soil loss from agricultural lands at various times of the year on a regional basis—to predict soil loss from construction sites. The Rainfall Erosivity Factor waiver is time-sensitive and is dependent on when during the year a construction activity takes place, how long it lasts, and the expected rainfall and intensity during that time. For information about the rainfall erosivity waiver, see Fact Sheet 3.1. Charts detailing the value of the Rainfall Erosivity Factor by particular regions can be found in Chapter 2 of the RUSLE user's guide, which can be downloaded at: http://www.epa.gov/owm/sw/phase2.

b. *What is a "TMDL" in Waiver ❷?*

For impaired waters where technology-based controls required by NPDES permits are not achieving State water quality standards, the CWA requires implementation of the TMDL process. The TMDL process establishes the maximum amount of pollutants a waterbody can assimilate before water quality is impaired, then requires that this maximum level not be exceeded.

A TMDL is done for each pollutant that is found to be contributing to the impairment of a waterbody or a segment of a waterbody. To allow a waiver for construction activities, a TMDL would need to address sediment, or a parameter that addresses sediment such as total suspended solids, turbidity, or siltation. Additional TMDLs addressing common pollutants from construction sites such as nitrogen, phosphorus, and oil and grease also may be necessary to ensure water quality protection and allow a waiver from the NPDES storm water program.

A TMDL assessment determines the source or sources of a pollutant of concern, considers the maximum allowable level of that pollutant for the waterbody, then allocates to each source or category of sources a set level of the pollutant that it is allowed to discharge into the waterbody. Allocations to *point sources are called wasteload allocations.*

How Would an Operator Qualify for, and Certify to, Waiver ❷?

EPA expects that when TMDLs, or equivalent analyses are completed, there may be a determination that certain classes of sources, such as small construction activity, would not have to control their contribution of pollutants of concern to the waterbody in order for the waterbody to be in attainment with water quality standards (i.e., these sources were not assigned wasteload allocations). In such a case, to qualify for waiver ❷, the operator of the construction site would need to certify that its construction activity will take place, and the storm water discharges will occur, within the area covered either by the TMDLs or equivalent analysis. A certification form would likely be provided by the NPDES permitting authority for this purpose.

What Does the Phase II Construction Program Require?

T*he Phase II Final Rule requires operators of Phase II* small construction sites, nationally, to obtain an NPDES permit and implement practices to minimize pollutant runoff. It is important to note that, locally, these same sites also may be covered by State, Tribal, or local construction runoff control programs (see Fact Sheets 2.6 and 2.7 for information on the Phase II small MS4's construction program). For the Phase II small construction program, EPA has taken an approach similar to Phase I where the program requirements are not fully defined in the rule but rather in the NPDES permit issued by the NPDES permitting authority.

EPA recommends that the NPDES permitting authorities use their existing Phase I large construction general permits as a guide to developing their Phase II small construction permits. In doing so, the Phase II requirements would be similar to the three general Phase I requirements summarized below.

- ☐ Submission of a ***Notice of Intent*** (NOI) that includes general information and a certification that the activity will not impact endangered or threatened species. This certification is unique to EPA's NOI and is not a requirement of most NPDES-delegated State's NOIs;
- ☐ The development and implementation of a ***Storm Water Pollution Prevention Plan*** (SWPPP) with appropriate BMPs to minimize the discharge of pollutants from the site; and

- ☐ Submission of a *Notice of Termination* (NOT) when final stabilization of the site has been achieved as defined in the permit or when another operator has assumed control of the site.

Can the Permitting Authority Reference a Qualifying Erosion and Sediment Control Program in NPDES Construction Permits?

Yes. The Phase II Rule allows the NPDES permitting authority to include in its NPDES permits for large and for small construction activity conditions that incorporate by reference qualifying State, Tribal, or local erosion and sediment control program requirements. A qualifying program must include the following requirements:

- ☐ Requirements for construction site operators to implement appropriate erosion and sediment control best management practices;
- ☐ Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste that may cause adverse impacts to water quality;
- ☐ Requirements for construction site operators to develop and implement a storm water pollution prevention plan; and
- ☐ Requirements to submit a site plan for review that incorporates consideration of potential water quality impacts.

In addition to the four elements above, a qualifying program for large construction activities must also include any additional requirements necessary to achieve the applicable technology-based standards of "Best Available Technology" (BAT) and "Best Conventional Technology" (BCT) based on the best professional judgment of the permit writer.

Should a State, Tribal, or local program include one or more, but not all, of the elements listed above, the permitting authority can reference the program in the permit, provided it also lists the missing element(s) as a condition in the permit.

What are Some Recommended BMPs for Small Construction Sites?

The approach and BMPs used for controlling pollutants in storm water discharges from small construction sites may vary from those used for large sites since their characteristics can differ in many ways. For example, operators of small sites may have more limited access to qualified design personnel and technical information. Also, small sites may have less space for installing and maintaining certain BMPs.

As is the case with all construction sites, erosion and sediment control at small construction sites is best accomplished with proper planning, installation, and maintenance of controls. The following practices have shown to be efficient, cost effective, and versatile for small construction site operators to implement. The practices are divided into two categories: non-structural and structural.

- ☐ **Non-Structural BMPs**
  - Minimizing Disturbance
  - Preserving Natural Vegetation
  - Good Housekeeping
- ☐ **Structural BMPs**

  Erosion Controls
  - Mulch
  - Grass
  - Stockpile Covers

  Sediment Controls
  - Silt Fence
  - Inlet Protection
  - Check Dams
  - Stabilized Construction Entrances
  - Sediment Traps

Most erosion and sediment controls require regular maintenance to operate correctly. Accumulated sediments should be removed frequently and materials should be checked periodically for wear. Regular inspections by qualified personnel, which can allow problem areas to be addressed, should be performed after major rain events.

For Additional Information

Contact

☞ U.S. EPA Office of Wastewater Management
- Phone: 202 260-5816
- *E-mail:* SW2@epa.gov
- Internet: www.epa.gov/owm/sw/phase2

☞ Your local soil conservation district office. They can provide assistance with RUSLE and other conservation related issues.
- A list of conservation district contacts is available at: www.nacdnet.org/resources/cdsonweb.html

Reference Documents

☞ Storm Water Phase II Final Rule Fact Sheet Series
- Internet: www.epa.gov/owm/sw/phase2

☞ Storm Water Phase II Final Rule (64 *FR* 68722)
- Internet: www.epa.gov/owm/sw/phase2
- Contact the U.S. EPA Water Resource Center
  - Phone: 202 260-7786
  - E-mail: center.water-resource@epa.gov

☞ *Agricultural Handbook Number 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)*, Chapter 2, pp. 21-64, January 1997.
- Internet: www.epa.gov/owm/sw/phase2

☞ *Guidance for Water Quality Based Decisions: The TMDL Process.* April 1991. U.S. EPA Office of Water. EPA 440/4-91-001.
- Internet: www.epa.gov/OWOW/tmdl

☞ *NPDES General Permit for Storm Water Discharges from Construction Activities* (63 FR 7857).
- Internet: www.epa.gov/owm/sw
- Contact the U.S. EPA Water Resource Center
  - Phone: 202 260-7786
  - E-mail: center.water-resource@epa.gov

ENVIRONMENTAL PROTECTION AGENCY

[FRL–6472–8]

Report to Congress on the Phase II Storm Water Regulations

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of availability of Report to Congress.

SUMMARY: EPA submitted a Report to Congress prior to promulgation of the new Phase II storm water regulations. The Report was required in the Agency's appropriation legislation for fiscal year 2000. The appropriation legislation also requires that USEPA invite public comment on the Report. By this notice, USEPA invites public comment.

DATES: Written comments on this notice and the Report to Congress must be submitted on or before January 7, 2000.

ADDRESSES: The Report to Congress on the Phase II Storm Water Regulations is available through the Internet on the EPA Office of Wastewater Management web site at http://www.epa.gov/owm/sw/phase2. Hard copies may be obtained by contacting the U.S. EPA Water Resource Center, 401 M Street, S.W., Washington, D.C. 20460; telephone: (202) 260–7786 (24-hour voice mail), fax: (202) 260–0386, e-mail: center.resource@epa.gov. Comments should be mailed to George Utting, USEPA, Office of Wastewater Management, Mail Code 4203, 401 M Street, S.W., Washington, D.C. 20460. Comments also may be faxed to (202) 260–1460 or submitted via the Internet to sw2@epamail.epa.gov.

FOR FURTHER INFORMATION CONTACT: George Utting, Office of Wastewater Management, Mail Code 4203, 401 M Street, S.W., Washington, D.C. 20460; telephone (202) 260–9530; email: sw2@epamail.epa.gov.

SUPPLEMENTARY INFORMATION: On October 29, 1999, the Administrator of EPA signed a regulation that implements Section 402(p)(6) of the Clean Water Act. This rulemaking is referred to as the final Phase II storm water rule and is also published in today's **Federal Register**.

The Phase II storm water rule expands the existing National Pollutant Discharge Elimination System (NPDES) permitting program to address storm water runoff from construction sites between one and five acres and municipal separate storm sewer systems in urbanized areas serving populations of less than 100,000. The Phase II rule builds on the existing Phase I program, which controls storm water runoff from municipalities with populations greater than 100,000 and 11 industrial categories, including construction disturbing over five acres.

Statutory Authority

The Report to Congress on the Phase II Storm Water Regulations was required by section 431(a) of the Departments of Veterans Affairs and Housing and Urban Development and Independent Agencies Appropriations Act of 2000, Public Law 106–74 (1999) (Appropriations Act). Section 431(a) of the Appropriations Act directed EPA to submit a report that addresses the following issues with respect to the Phase II Storm Water Rule: (1) An analysis of the impact of the rule on local governments, (2) an explanation of the rationale for lowering the threshold for regulation of construction sites from 5 acres to 1 acre, (3) an explanation of why the coverage of the regulation is based on a census-determined population instead of a water quality threshold and documentation that storm water runoff is generally a problem in communities with populations of 50,000 to 100,000, and (4) information that supports the position of the Administrator that the Phase II storm water program should be administered as part of the NPDES permit program.

On October 28, 1999, EPA delivered to the Committee on Environment and Public Works in the Senate and the Committee on Transportation and Infrastructure in the House of Representatives a report that satisfied the mandate of section 431(a). Section 431(c) of the Appropriations Act directs EPA to publish the report in the **Federal Register** for public comment. By today's notice, EPA invites public comment by January 7, 2000. EPA will carefully review and evaluate comments received and determine whether the comments warrant further action.

Dated: November 4, 1999.

J. Charles Fox,

Assistant Administrator, Office of Water.

[FR Doc. 99–29301 Filed 12–7–99; 8:45 am]

BILLING CODE 6560–50–P

D.2.40 Responses to Comments from David Farrel, Federal Activities Office, U.S. Environmental Protection Agency, San Francisco, CA (January 25, 2001)

D.2.40.1 Response to Comment 20-1

Comment noted.

D.2.40.2 Response to Comment 20-2

Chapter 1 of the EIR/EIS has been revised based on this comment.

In addition, EIR/EIS Chapter 2 provides descriptions of a wide range of BMPs that have been integrated into the proposed project to control pollutants in stormwater discharges from the project site. The District will also file a notice of intent to discharge stormwater with the RWQCB.

D.2.40.3 Response to Comment 20-3

The secondary project objectives are not an integral element of the purpose and need for the project under NEPA. The secondary objectives were not used as screening criteria to eliminate "otherwise reasonable alternatives." Rather, the secondary objectives were used to evaluate and refine alternatives during the planning and design phase of the project. These alternatives were carried for detailed consideration in the EIR/EIS.

D.2.40.4 Response to Comment 20-4

Chapter 1 of the EIR/EIS has been revised based on this comment.

D.2.40.5 Response to Comment 20-5

Comment noted.

D.3 REFERENCES CITED IN THIS APPENDIX

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